

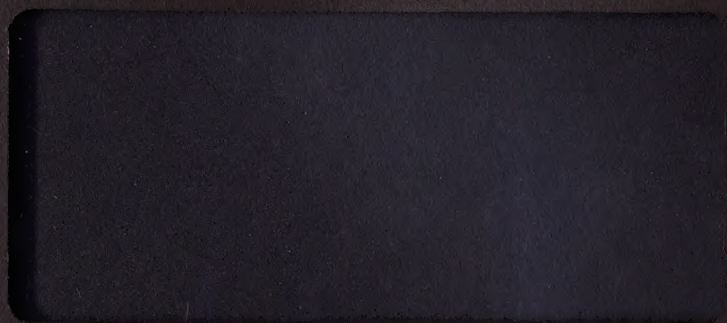
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*DECOM SYSTEMS, INC.
INSTRUCTION MANUAL*

MODEL 7132

PSK MODEM





**DECOM SYSTEMS, INC.
INSTRUCTION MANUAL**

MODEL 7132

PSK MODEM

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1.1 GENERAL DESCRIPTION

The DSI Model 7132 PSK Demodulator is designed to synchronously demodulate a carrier signal which has been phase shift-keyed by a PCM bit stream. The unit is tuned to a single carrier frequency within the range of 10K to 130MHz at modulation rates up to 5 MB/s.

The 7132 incorporates the unique Costas loop filter design which allows ease of input bandwidth tuning and very low implementation loss. Input bandwidths as great as 20% and as low as 0.01% are available with the multiple bandwidth and tracking loop features which are standard in the 7132. This translates to carrier-to-bit rate ratios of 5 to 1 minimum and 10K to 1 maximum.

The 7132 has a modulator option for modem applications, or may be used for quick check out of the demodulator. The modulator Cf may be any frequency within the range of 10K to 130MHz, and need not be the same as the demodulator Cf.

1.2 ELECTRICAL SPECIFICATIONS

1.2.1 PSK Demodulator

1.2.1.1. Input Impedance 50 Ohms

1.2.1.2. Input Signal Level
-30 dBm to -10 dBm (7mv to 70mv RMS). This range refers to the PSK signal level. Composite signals up to 3v RMS will not damage unit.

1.2.1.3. Loop Bandwidth and Sync Threshold
A front panel switch allows selection of two loop bandwidths. Five configurations are available in the standard unit.

LOOP CONF.	NARROW	WIDE	
1	.003	.03	
2	.01	.1	
3	.03	.3	Percent of carrier Cf
4	.1	1.	
5	.3	3.	

LOOP CONF.	Cf
1-5	10 KHz to 2 MHz
1-4	2 MHz to 15 MHz
1-3	15 MHz to 50 MHz
1-2	50 MHz to 130 MHz



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1.2.1.3 Loop Bandwidth and Sync Threshold, Continued

Special loop configurations may be provided. Contact DSI for information.

In general, the carrier NARROW loop bandwidth should be selected to be not greater than 2% of the modulation rate (PCM bit rate). This provides synchronization threshold of 8 dB E/N and bit error rates in the region of 1×10^{-3} , assuming an ideal bit synchronizer is used. Usually signal conditions are better than 8 dB E/N, however, synchronization thresholds as low as 0 dB can be provided. See Figure 1-1.

EXAMPLE: For carrier frequency of 50 KHz and bit rate of 100 bps, the loop bandwidth should be 2% of 100 (2 Hz). This is .004% of the carrier Cf. Select loop configuration 1.

1.2.1.4. Loop Capture Range

Capture range is $\pm 3X$ the selected loop bandwidth, applicable when the selected input bandwidth is at least 20X greater than the selected loop width.

1.2.1.5 Input Bandwidth

Four input bandwidths are selectable via a front panel switch. These bandwidths may be selected in any increments of each other with a maximum spread of 100 to 1 from BW 1 (lowest) to BW 4.

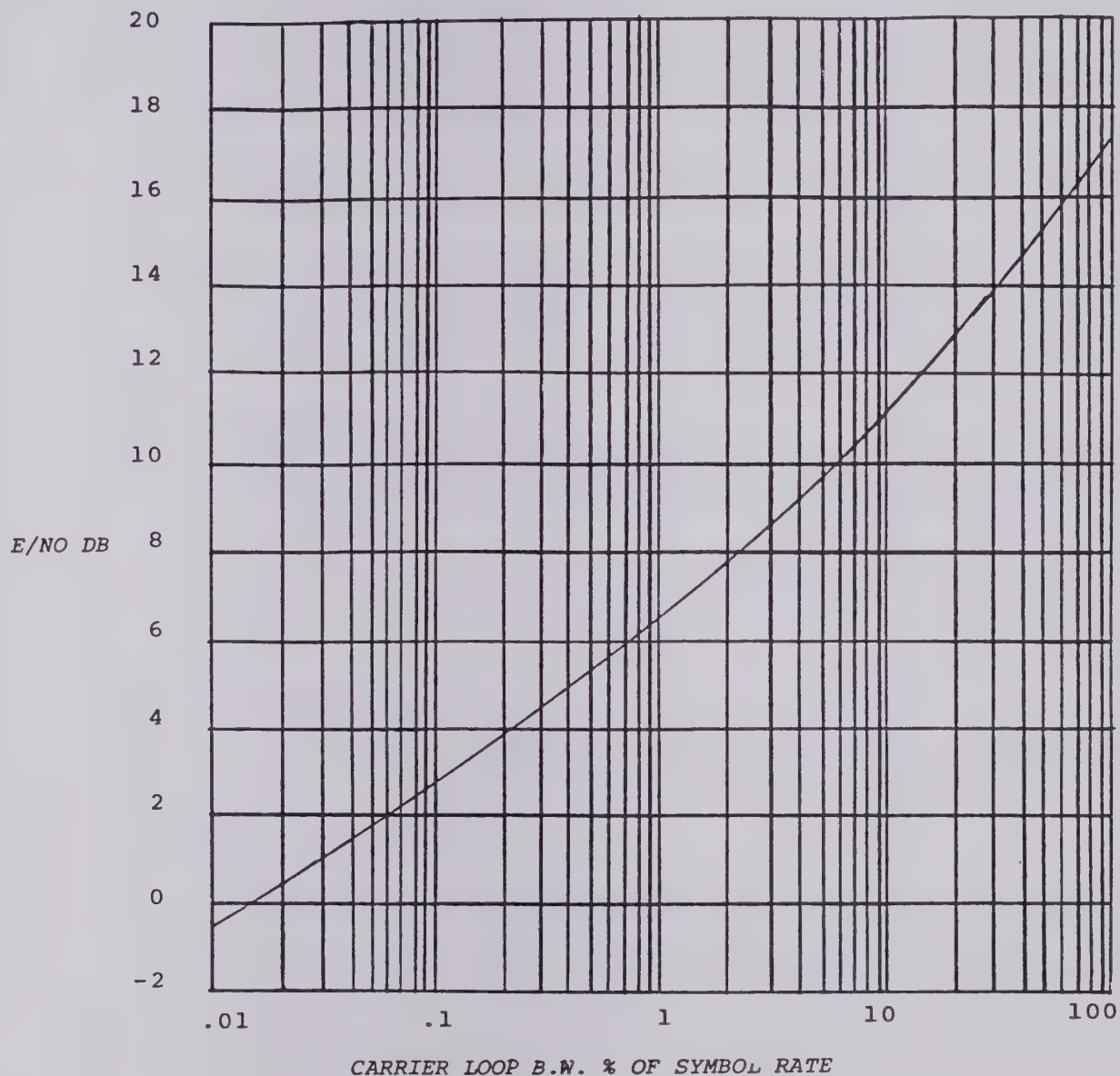
The maximum bandwidth is 20% of carrier center frequency or 10 MHz whichever is the least.

Selection of input bandwidth should be made with consideration of the modulation rate (PCM bit rate) and adjacent interference signals. The bandwidth should be 1X BR for NRZ codes and 2X BR for B1 ϕ , DM codes.



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FIGURE 1-1 SYNCHRONIZATION THRESHOLD/CARRIER LOOP BW



- SYNCHRONIZATION IS MAINTAINED WITH ANY CONDITION ABOVE THE CURVE.
- TYPICAL PERFORMANCE FOR SYNCHRONOUS BPSK DEMODULATORS.
- TO DETERMINE THE REQUIRED *Lbw* FOR A GIVEN CONDITION.

$$Lbw = \frac{X \text{ SYMBOL RATE}}{\text{CARRIER } Cf}$$

$$Lbw = \text{CARRIER LOOP B.W. \% OF } Cf$$

$$X = \text{POINT FROM CURVE}$$



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1.2.1.6 Bit Error Rate

The 7132 introduces less than 1 dB implementation loss at E/N as low as 3 dB from synchronization threshold, as long as the composite of all noise and interference over any bandwidth does not result in actual signal-to-noise ratios of less than -20 dB. The term E/N, Energy Contract Ratio, refers to the relationship of signal and noise in the same bandwidth (BW = PCM bit rate).

BER is within 2 dB of the curve (Figure 1-2) when the 7132 is used in conjunction with a nearly optimum bit synchronizer.

1.2.1.7. Inputs

Two rear panel BNC inputs are provided. Either of these inputs may be selected via a front panel switch. In position "S1", the input is via J4 of the rear panel. In position "S2", the input is via J5 of the rear panel.

1.2.1.8 Demodulator Outputs

- o DEMODULATED PCM DATA - "DEMOD OUT" 1.5v p-p ± 3 dB over the entire input dynamic range of the demodulator. This output is balanced around ground level and will supply the rated output voltage into a 75 ohm load.
- o SYNC STATUS OUTPUT - TTL signal with rated fan-out of 10 standard loads. LOGIC 1 when the demodulator is in sync or 0 when out of sync.

1.2.1.9 Test Outputs

- o DEMOD OUT - Front panel BNC, isolated demodulator output provided for monitoring the demodulated PCM data. This output may be shorted to ground with no effect the unit's performance.

1.2.1.10 Front Panel Controls

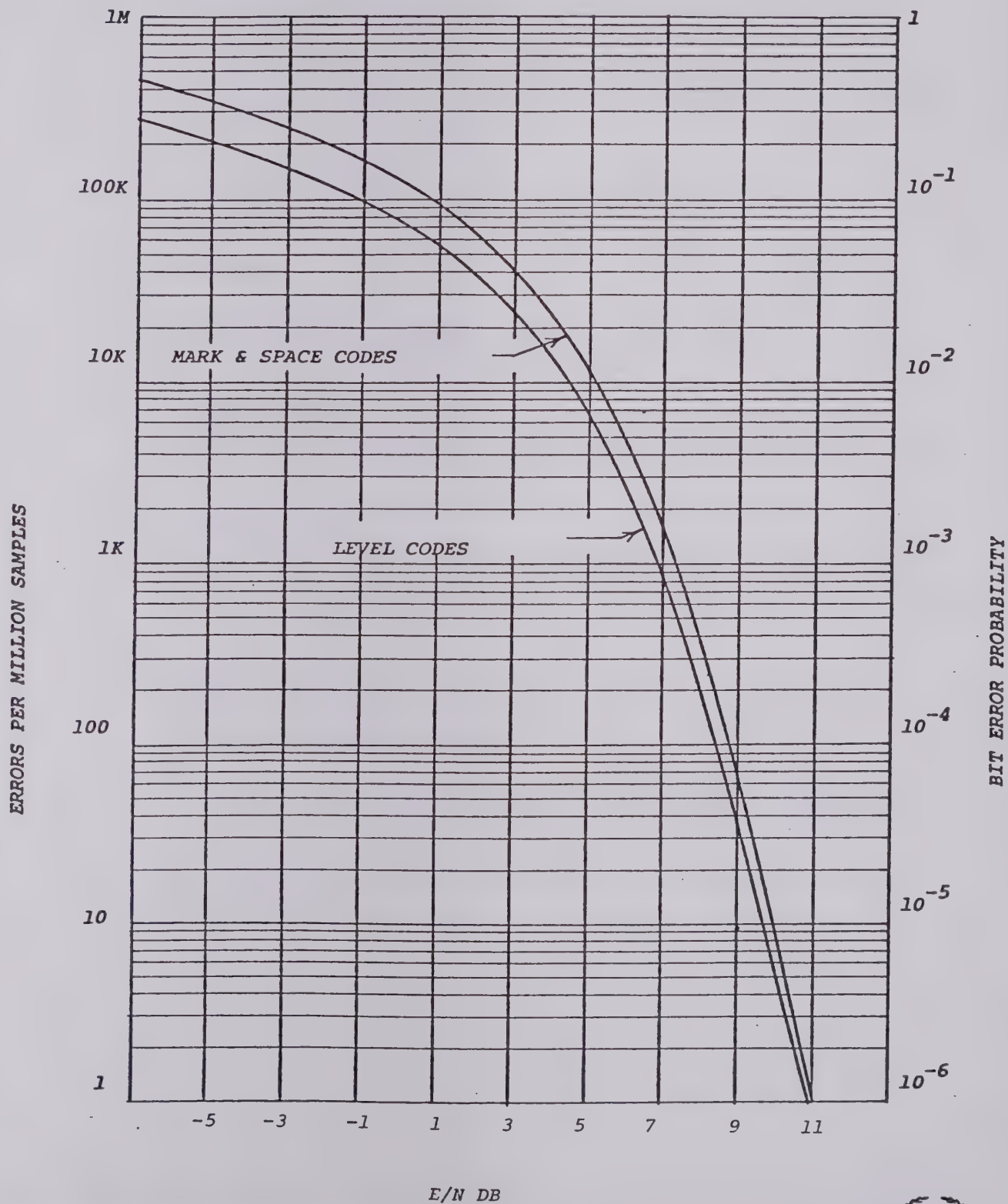
- o DEMODULATOR:
 - Power - Lighted pushbutton switch
 - Bandwidth - Five position rotary switch, position 1-4 select BW 1-4 respectively. When in the fifth position RMT the input bandwidth is controlled via the optional computer interface or GPIB.
 - Loop Width - Two position toggle switch selects either the wide or narrow loop width.
 - VCO Balance - Provides vernier control of the input center frequency.



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FIGURE 1-2 BIT ERROR RATE/SIGNAL TO NOISE RATIO

IDEAL PERFORMANCE



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1.2.1.11 Front Panel Indicators

o CARRIER CENTER FREQUENCY DEVIATION:

A front panel meter displays carrier deviation from center frequency. A right-wise full scale deflection indicates the input carrier is at the upper band edge of the demodulator's tracking range. Likewise, a left-wise deflection indicates the lower band edge. The meter range is approximately 5 times the selected loop bandwidth.

o SYNCHRONIZATION:

A green LED indicates an IN SYNC condition when the lamp is on and OUT OF SYNC when the lamp is off.

1.2.2 MODULATOR

1.2.2.1. Center Frequency

Fixed tuned to any single frequency...10K to 130MHz.
Crystal controlled to +0.003% accuracy.

1.2.2.2. Modulation Form

Double side band suppressed carrier (BIØ PSK) +1.57 radians.
Modulation may be any serial data stream such as standard IRIG PCM codes.

1.2.2.3. Modulation Input

The modulation signal is routed to the modulator via J8 of the rear panel. This signal should be TTL compatible. Carrier phase reversal occurs when the input to J8 switches from LOGIC 1 to LOGIC 0 level or vice-versa.

1.2.2.4. Side Band Filter

A filter is provided to limit the input modulation bandwidth thereby limiting the carrier side bands. A front panel switch allows bypassing this filter.

The filter cutoff is fixed at a customer specified frequency. For carriers Cf up to 3MHz, the filter range is 10Hz to 1MHz and 10Hz to 5MHz for Cf's greater than 3MHz.

The minimum cutoff should be 1.5X BR for NRZ codes and 3X BR for BIØ or DM codes.

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1.2.2.5 Mixer Input

A mixer input is provided to linearly add an external signal to the carrier. This may be used to multiplex other data channels or to add interference signals for performance testing.

The signal interface is via J7 of the rear panel. A front panel switch is provided to turn this signal ON or OFF.

1.2.2.6 Carrier Output

The carrier output is available at J6 of the rear panel MOD OUT. A front panel switch allows this signal to be turned ON or OFF with no effect on the mixer input.

The output is adjustable from nearly zero to 2V p-p via a control inside the unit for units with CF's up to 3MHz and is fixed at -10 dBm 70mv RMS above 3MHz. An optional buffer circuit is available to boost this voltage to +10 dBm.

1.2.2.7 Front Panel Controls

- o Carrier ON/OFF toggle switch.
- o Side Band Filter IN/BYPASS toggle switch.
- o Mixer ON/OFF toggle switch.

1.2.2.8 Front Panel Test Point

MOD OUT: Isolated monitor point of the carrier + mix output MOD OUT.

1.2.3 AC Power Requirements

- o 120 volts RMS +10% 230v operation is available.
- o 3 Wire grounded.
- o 47 to 63Hz
- o 40 Watts Maximum

DECOM SYSTEMS INC.**1.3****ENVIRONMENTAL SPECIFICATIONS**

- o **ALTITUDE:** 0 to 10,000 feet, operating.
- o **HUMIDITY:** 5% to 95% Non-condensing, operating.
- o **TEMPERATURE:** 0°C to 50°C, operating
-55°C to 85°C, storage
- o **SHOCK:** Per MIL-STD-810A Method 516, Procedure III, non-operating.
- o **VIBRATION:** Per MIL-STD-810A Method 514, Equipment Class 6, Figure 514-6, Curve A, non-operating.

1.4**MECHANICAL SPECIFICATIONS**

- o **PANEL SIZE:** 3.5" H x 19" W x 20" D
- o **PANEL FINISH:** Grey semigloss baked enamel with black lettering standard: Special FED STD 595 paint colors are available.
- o **MOUNTING:** Slides and hardware for installation in a EIA-type rack can be provided.
- o **CONNECTORS:** BNC type for single signals.
- o **WEIGHT:** 30 Lbs. (18.1 KG) maximum, excluding slides.
- o **COOLING:** Natural convention.

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SECTION II
INSTALLATION



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2.1 GENERAL

This section covers the procedure for installation of the Model 7132 prior to operation of the unit.

2.2 UNPACKING AND VISUAL INSPECTION

Remove the unit from the carton and perform a general visual inspection of the unit's exterior. Check for broken controls, displays, indicators or for damage to the chassis.

Remove the TOP COVER and examine the interior. Check for loose or broken circuit mounting planes, power supplies, front and rear panel wiring. If everything appears to be intact, replace top cover.

2.3 MOUNTING

After the visual inspection has been performed, the unit is ready for mounting in a standard 19" instrumentation rack. The mounting ears allow installation via standard EIA mounting screw spacing.

This unit cannot be mounted by the front panel ears alone and MUST be supported by a rack cross-member across the bottom rear of the unit, if slides are not used.

The unit has been pre-drilled to accept slides and the use of slides is recommended.

2.4 COOLING

Cooling is not necessary unless the ambient temperature exceeds 50°C.

2.5 FUSES

1/2 AMP 3AG SLO-BLO, for 115v operation.

1/4 AMP 3AG SLO-BLO, for 220v operation.

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MODEL 7132

TABLE 2-1 SIGNAL CONNECTIONS

CONNECTOR	FUNCTION	TYPE
J1	AC POWER	TWISTLOCK
J2	SIG GND	BINDING POST
J3	CHAS GND	BINDING POST
J4	DEMOD IN 1	BNC
J5	DEMOD IN 2	BNC
J6	MOD OUT	BNC
J7	MIXER IN	BNC
J8	DEMOD OUT	BNC
J9	MOD DATA IN	BNC
J14	SYNC & POWER ON STATUS	CANNON D



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MODEL 7132

TABLE 2-2 J13, COMPUTER CONTROL OPTION

PIN	FUNCTION	PIN	FUNCTION
1	INSTRUCTION BIT 1	26	READBACK BANDWIDTH 1
2	INSTRUCTION BIT 2	27	READBACK BANDWIDTH 2
3	INSTRUCTION BIT 3	28	READBACK BANDWIDTH 3
4	INSTRUCTION BIT 4	29	READBACK BANDWIDTH 4
5	INSTRUCTION BIT 5	30	READBACK WIDE LOOP/NARROW
6	INSTRUCTION BIT 6	31	READBACK INPUT 1/INPUT 2
7	INSTRUCTION BIT 7	32	READBACK CARRIER ENABLED
8	INSTRUCTION BIT 8	33	READBACK MIXER ON
9	SUB MODULE ADDRESS 9	34	READBACK FILTER IN
10	SUB MODULE ADDRESS 10	35	GROUND
11	SUB MODULE ADDRESS 11	36	
12	SUB MODULE ADDRESS 12	37	
13	MODULE ADDRESS 13	38	
14	MODULE ADDRESS 14	39	
15	MODULE ADDRESS 15	40	
16	MODULE ADDRESS 16	41	
17	GROUND	42	
18	INPUT STROBE	43	
19	GROUND	44	
20	INPUT REQUEST	45	
21	GROUND	46	
22	POWER ON STATUS	47	
23	LOCAL/REMOTE STATUS	48	
24	SYNC STATUS *	49	
25	GROUND *	50	

*Supplied without computer control option.



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SECTION III

OPERATION



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3.1 GENERAL

The 7132 may be operated manually or by remote control via a rear panel interface, J13, when the computer interface option is included.

3.2 PSK DEMODULATOR

3.2.1 Input Source Select Switch

Two input signals may be connected to the 7132 and either may be selected via the source switch. When the frequency converter option is supplied, S1 will operate @ Cf, S2 will operate @ the IF frequency.

3.2.2. Input Bandwidth Switch

Select the correct bandwidth for operation. In general, use a bandwidth at least 2X the modulation rate (PCM Bit Rate) for NRZ codes and 4X for B10, or DM codes. When noise or other interference signals are minimal, wider bandwidths may be used with no signal degradation.

CAUTION

Certain input/loop bandwidth combinations are invalid for operation. Refer to the record sheet at the beginning of this manual for information on your particular configuration.

The invalid conditions result when the selected input bandwidth is less than 20X the loop bandwidth. The 7132 will operate when this ratio between 5 and 20 with degraded sync properties.

3.2.3. Loop Bandwidth

Select the loop bandwidth which is compatible with the signal-to-noise ratio of the input signal. This is described in detail in Section 1.

Generally, best performance is achieved in the NAR loop position.

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3.2.4 VCO Balance

The front panel VCO balance provides vernier control of the XVCO to compensate for slight variations of the subcarrier frequency.

To begin with, set the VCO BAL to its approximate center. When the demodulator acquires synchronization, the green sync lamp will turn on indicating an IN SYNC condition. For optimum performance, adjust the balance control so the deviation meter is at or near center scale.

If the demodulator does not synchronize immediately, turn the VCO balance fully counter clockwise then slowly turn it clockwise until synchronization is acquired. It may be helpful to monitor the DEMOD OUT test point of the 7132 front panel with an oscilloscope. The wave forms below are typical for IN SYNC and OUT OF SYNC conditions.

"IN SYNC"



"OUT OF SYNC"



3.2.5 Input Signal Level

The 7132 demodulator is designed to operate with a relatively low level signal (7mv to 70mv RMS). Signal levels up to 1v p-p may be used with very little degradation. However, to optimize performance, use an attenuator pad to adjust the signal within this range.

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3.2.6 Demodulator Output

The 7132 is designed to interface with all DSI bit synchronizers, decommutators and most other makes as well. When interfacing with any bit synchronizer, make sure the rated 1.5v p-p ± 3 dB output of the 7132 is within the input range of the bit sync.

The output circuit is designed to drive a 75 ohm coax line such as RG-59; however, 50 to 90 ohm cables may be used up to 100 feet in length.

For best results, terminate the cable with a matching load resistor.

3.3 PSK MODULATOR (OPTION)

Operation of the PSK modulator is total independent of the demodulator section, and is accomplished by three front panel toggle switches or by remote control when the computer interface is purchased.

3.3.1. Carrier ON/OFF Switch

The internally generated carrier signal may be energized or de-energized by the action of this switch. NOTE: A signal applied to the mixer input is not de-energized when this switch is OFF.

3.2.2. Mixer ON/OFF Switch

A signal applied to the mixer input may be energized or de-energized by the action of this switch.

3.3.3. Side Band Filter Switch

When this switch is in the IN position, the PCM data applied to the rear panel input is filtered prior to entering the modulator circuitry.

In the BYPASS position, unfiltered data is used to modulate the carrier.

See the record sheet at the beginning of this manual for the cut off frequency.

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3.3.4 Mixer Input

A signal applied to the mixer input J7 of the rear panel is linearly summed to the PSK carrier signal.

- o Input bandwidth, 3KHz to 3MHz, or 1MHz to 130MHz with the wide band option.
- o Gain approximate unity carrier output is terminated by a 50 ohm load.
- o Maximum input voltage 1v p-p without distortion. Signals up to 10v p-p will not damage the unit.

3.3.5 Mod Data IN

The carrier signal is modulated via this input (J9 on the rear panel).

- o Input Voltage This interface is designed to operate from TTL signals.

0	0.4 Volts = LOGIC 0
2.4	5.0 Volts = LOGIC 1

- o Input Loading 1 STD TTL LOAD

NOTE: A 100 ohm line termination is provided on the modulator assembly. Connection is optional and may be used when the cable length between the data source and modulator causes ringing (reflections) at the modulator input. See the Schematic and Assembly Drawings.

3.3.6. Mod OUT

The modulated carrier and mixed signal is presented at J6 of the rear panel.

- o Output Level- For units up to 3MHz, this output is adjustable from 0 to 2v p-p (open circuit), or 0 to 1v p-p when loaded by 50 ohms. For units above 3MHz, this level has no effect on the mixer input.
- o Output Impedance-50 Ohms

3.4

REMOTE OPERATION

The model 7132 PSK Modem may be controlled remotely when the computer interface option is supplied.

To operate in remote control, set the bandwidth switch to RMT. In this position, all functions of the 7132 except the VCO vernier and power ON/OFF are controlled remotely.

The remote control device must supply a 16-bit control word plus an INPUT STROBE, which loads the operating instructions into the storage registers.

The instruction data must be stable 100ns minimum prior to raising the input strobe line and must remain stable for 100ns minimum afterwards. After data has been loaded, the 7132 lowers the instruction request line, indicating the fact. This signal may be used for the controlling device to reset the input strobe. A high level on the instruction request line indicates the 7132 is ready for an instruction.

The 16-bit control word is broken into three groups:

MODULE ADDRESS	BITS 13-16
SUB-MODULE ADDRESS	BITS 9-12
INSTRUCTION	BITS 1-8

3.4.1

Module Address

Up to sixteen units of various types with the same interface may be controlled by a common bus. Each module unit is assigned its own module address number (Binary 0-15).

The module address number of the 7132 is programmable via dipswitches mounted inside the unit. Switch number 1 through 4 corresponds to bits 16 (MSB) to 13. Select the desired module address, program the switch with the + side up for a LOGIC 1.

Two or more 7132 units may be loaded simultaneously by using the same module address number.

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3.4.2 Sub-Module Address

Bits 12-9 control the sub-module address. The 7132 has two sub-modules; Demodulator and Modulator. To control the Demodulator, program bits 12-9 to all zeros. To control the Modulator, program bits 12-9 to 0001 respectively.

3.4.3 Instruction

The remaining 8 bits control the sub-module functions. Refer to Table 3-1. All setup instructions are made with a single input strobe for each sub-module (Demodulator or Modulator).

NOTE: Only 6 of the 9 instruction bits are used to set up the Demodulator and 4 for the Modulator.

3.4.4. Data Save

Storage devices in the 7132 allow switching from RMT to LOCAL and back to RMT without changing to RMT program.

3.4.5 Input Level

The computer interface is compatible with TTC logic levels where LOGIC 1 is the active level.

0 to 0.4 Volts = LOGIC 0
2.4 to 5.0 Volts = LOGIC 1

3.4.6 Input Loading

One standard TTL load for each input.

NOTE

The input strobe line may be terminated by a 100 ohm load which is provided on the PC Assembly. See the Assembly and Schematic Diagrams.



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TABLE 3-1 MODULE ADDRESS PROGRAMMING TABLE

MODULE ADDRESS					SUB-MODULE ADDRESS				INSTRUCTION								FUNCTION		
Bit	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1			
SELECTABLE VIA DIP SWITCHES ON P.C. CARD 0-15					0	0	0	0									1	BANDWIDTH	1
					DEMOD												1		2
																	1		3
																	1		4
																	0	NARROW LOOP	
																	1	WIDE LOOP	
																	1	INPUT 1	
																	0	INPUT 2	
									X	X	0	1	0	0	1	0	EXAMPLE 1		
					0	0	0	1									1	CARRIER ON	
				MOD												0	CARRIER OFF		
																1	MIX ON		
																0	MIX OFF		
																1	SIDE BAND FIL IN BYPS		
																0			
								X	X	X	X	X	0	1	1	EXAMPLE 2			

EXAMPLE 1:

 When the instruction bits are as shown, the
DEMOM is programmed to:

 BANDWIDTH 2
WIDE LOOP
INPUT 1

EXAMPLE 2:

MOD to:

 CARRIER ON
MIX ON
SIDE BAND FILTER BYPASSED


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3.5 GPIB INTERFACE OPERATION

3.5.1 General

The GPIB Interface Option provides remote control capability for the 7132 whose systems incorporated the General Purpose Interface Bus (GPIB, also referred to as the IEEE-488 Bus, IEC Bus or HP-IB).

The GPIB interface permits the 7132 to be a basic bus listener or talker and respond to parallel and serial polls. This interface monitors the following: LOCAL/REMOTE Status, Sync Status, Selected Input, Selected Input Bandwidth, Selected Loop Bandwidth, and an unidentified control message. The interface controls input selection, input bandwidth and loop bandwidth.

3.5.2 Connection to GPIB

To operate with the GPIB interface, the BANDWIDTH switch on the front panel should be set to the REMOTE position "RMT". The interface includes the standard 24-pin connector.

When configuring the interface, two DIP switches inside the 7132 unit must be set to SW2 and SW3. The cover must be removed to set these switches. They are located on the board nearest the power supply.

SW2 controls the GPIB device address; bits 1 through 5 correspond to DI01 through DI05, respectively. The other bits are fixed by bus protocol and switches 6 through 8 are not used. Set in a "0" in the binary device address by pressing the marked side of the corresponding switches. GPIB protocol customarily sets aside addresses 00000 and 11111 for use by the controller.

If the 7132 is to respond to a parallel poll, one switch should be closed on SW3. The 7132 will assert the corresponding DIO line during a parallel poll if it previously received a parallel poll configure command (addresses command) and then assert the Service Request (SRQ) line. For a switch setting of "0", set the switch to ON and for a "1", set it to OFF.



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3.5.3

Standard Configuration

After the unit is powered ON in the REMOTE mode, the unit automatically takes on a standard configuration which is settable by DIP switches. If the unit is powered ON in the LOCAL mode, the unit will assume the standard configuration when switched to the REMOTE mode.

TABLE 3-2 STANDARD CONFIGURATION SWITCH SETUP

(Set to "0" by pressing the ON side and a "1" by pressing the OFF side of the switch).

SW	8	7	6	5	4	3	2	1
SW1	Carrier	Mixer	SB Filter	Input	Input Bandwidth			Loop BW
	ON=1 OFF=2	ON=1 OFF=0	IN=1 OUT=0	INP1=1 INP2=0	BW1 0	0 0	0 0	WIDE=1 NARROW=0
					BW2 1	0 0	0 0	
					BW3 0	1 0	0 0	
					BW4 0	0 1	1 0	

The last configuration setup by remote control will be reestablished when the unit is switched from REMOTE to LOCAL and back to REMOTE.

When power is applied to the 7132 or when IFC is detected, the interface is placed in an idle state. The power up bit in the status word is set and remains set until Device Clear occurs.



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3.5.4 Interface Messages Responded to by the 7132

IFC	Interface Clear	All handshake lines are released and the 7132 is in the idle state.
DI	Data IN	When in listener, reads data in on DI.
DO	Data OUT	When in talker, sends data out on DO.
MTA	My Talk Address	The 7132 is now addressed as a talker.
MLA	My Listen Address	The 7132 is now addressed as a listener.
UNT	Untalk	The 7132 is no longer addressed to talk and reverts to the idle state.
UNL	Unlisten	The 7132 is no longer addressed to listen and reverts to the idle state.
SPE	Serial Poll Enable	The 7132 responds with its status byte when addressed to talk or is already addressed to talk.
PPC	Parallel Poll Configure	The 7132 is prepared to receive the configuration data to follow.
PPE	Parallel Poll Enable	The 7132 receives and stores configuration data and updates the parallel poll register.
PPD	Parallel Poll Disable	The 7132 clears the parallel poll register and does not participate in subsequent parallel polls unless reconfigured and enabled.
PPU	Parallel Poll Unconfigure	A PPU is handled in the same way as a PPD by the 7132.
DCL/SDC	Device Clear	The 7132 power-cycled status bit is cleared.



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3.5.5 Device Dependent (7132) Messages (Listener)

These messages are used to transfer setup parameters from the bus controller to the 7132. Parameters can be sent at any time and in any order, but the actual setup of the 7132 conforms to these parameters only when the front panel LOCAL/REMOTE switch is in REMOTE.

All listener messages consist of strings of ASCII characters. The parity bit is ignored. Certain messages consist only of alphabetic characters. Others consist of an alphabetic character string followed by a digit. Messages may be strung together ad infinitum in any order and are implemented on receipt. Each message must be followed by a period or a carriage return. All blanks, spaces, hyphens and line feeds are ignored. It is not necessary to set EOI at the end of the string. Paragraphs 3.5.5.1 through 3.5.5.8 are the CONTROL MNEMONICS.

3.5.5.1 Input Selection

Input selection is made via the following message:

INPn. where n is 1 or 2 corresponding to selection 1 or 2.

3.5.5.2 Bandwidth Selection

Bandwidth selection is made via the following message:

BWn. where n is 1-4 corresponding to selections 1-4.

3.5.5.3 Loop Bandwidth

Loop bandwidth is selected via the following messages:

LBW0. Narrow
LBW1. Wide

3.5.5.4 Carrier Enable/Disable

The carrier may be enabled or disabled via the following messages:

CARE. Carrier enabled
CARD. Carrier disabled

3.5.5.5 Mixer ON/OFF

Mixer mode is selectable via the following messages:

MIXN. Mixer ON
MIXF. Mixer OFF

3.5.5.6 Side Band Filter IN/OUT

Side band filter mode is selected via the following messages:

FILI. Side band filter IN
FILO. Side band filter OUT



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3.5.5.7 PARALLEL POLL BIT SELECT

A status bit in the Serial Poll Word may be selected to be represented in the Parallel Poll Register by the following message:

PPBSETn. Where "n" is a bit number 0-7.

NOTE: This command is only effective when the 7132 is configured and enabled for parallel polling.

3.5.5.8 READBACK TYPE REQUEST

The "REQn." command sets the type of readback to be executed when the 7132 is placed in Talker. "REQ0." is the default mode. The "REQn." message is used as follows:

When placed in TALKER:

REQ0.	Send current status and configuration.
REQ1.	Send configuration and parallel poll bit selection value.

3.5.6 SERIAL POLL STATUS BYTE

The 7132 Status Byte is returned during a serial poll. The status bits are assigned as follows:

S7 - INVALID MESSAGE:	Turned ON by an untranslatable listener data message or in LOCAL mode whenever the listener function is used. Turned OFF when a Device Clear is executed.
S6 - SERVICE REQUEST:	Turned ON by the 7132 being switched into LOCAL mode or losing synchronization. Turned OFF when a Serial Poll occurs.
S5 - POWER CYCLED:	Turned ON by PON. Turned OFF by DCL + (MLA.SDC).
S4 - UNUSED	
S3 - UNUSED	
S2 - UNUSED	
S1 - SYNC STATUS:	1 = 7132 OUT OF SYNC 0 = 7132 IN SYNC
S0 - LOCAL/REMOTE:	1 = 7132 IN LOCAL MODE 0 = 7132 IN REMOTE MODE



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3.5.6 Readback from the 7132

The GPIB controller requests readback from the 7132 by:

- Setting the 7132 to LISTENER mode
- Sending a listener data message REQn. (optional)
- Setting the 7132 to TALKER mode

The current status and configuration is defined as the current state of the 7132 regardless of LOCAL/REMOTE state. The current status and configuration is sent back to the host as a single, fixed length string.

See Table 3-3 and Table 3-4 for REQn. status and configuration information.

TABLE 3-3 REQ0. STATUS AND CONFIGURATION READBACK (Default)

No. Byte	MSB				Bit			LSB	HEX Value	ASCII Value
	7	6	5	4	3	2	1			
0	0	1	0	0	0	1	0	0	44	D
1	0	1	0	0	1	1	0	1	4D	M
2	0	0	1	1	0=REMOTE 1=LOCAL	0=SYNC 1=OUT OF SYNC	0	1=UNIDENTIFIED MESSAGE	3x	
3	0	0	1	1	0=INPUT 1 1=INPUT 2	00=BANDWIDTH 1 01=BANDWIDTH 2 10=BANDWIDTH 3 11=BANDWIDTH 4		0=LOOP BW NARROW 1=LOOP BW WIDE	3x	
4	0	0	0	0	1	1	0	1	0D	(CR)
5	0	0	0	0	1	0	1	0	0A	(LF) + EOI



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TABLE 3-4 REQ1. CONFIGURATION AND PARALLEL POLL BIT SELECTION VALUE

Parameter	Beginning Char #	# of Chars	String
Input Selection	1	5	INP1. or INP2.
Bandwidth Selection	6	5	BWn.
Loop Bandwidth	11	5	LBW0. or LBW1.
Carrier Enable/Disable	16	5	CARE. or CARD.
Mixer Mode	21	5	MIXN. or MIXF.
Side Band Filter Mode	26	5	FILI. or FILO.
Parallel Poll Bit Select	31	8	PPBSETn.
Carriage Return	39	1	ASCII (CR)
EOS Character	40	1	ASCII (LF) + EOI

3.5.7.1 Monitor Message

The 7132 will activate the SRQ line in the event that:

- 1) It is switched to LOCAL mode in the status byte (STB) sent in response to the associate serial poll bit 1 (2^0) and shall be set to indicate the reason for SRQ.
- 2) It loses synchronization in the status byte (STB) sent in response to the associate serial poll bit 2 (2^1) and shall be set to indicate the reason for SRQ.

3.5.7.2 Unidentified Message

This monitor message bit shall be set:

- 1) In LOCAL mode whenever the listener function is used.
- 2) In REMOTE mode whenever a message is received which has an unacceptable length (not integer multiples of four bytes) and/or a character string not specified in Table 3-4.

Note: In REMOTE mode, the unidentified message bit gets cleared by My Listen Address (MLA).



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SECTION IV

THEORY OF OPERATION



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4.1 GENERAL

The 7132 PSK Demodulator was designed to separate a phase shift keyed carrier from a composite signal consisting of the PSK/PCM signal, white noise and other spurious signals.

Basically, the 7132 performs two major functions:

- o Separation of the PSK carrier from the composite signal;
- o Demodulation of the PCM signal.

Refer to the Block Diagram, Figure 4-3 and the wave forms shown in Figure 4-2.

In order to properly understand the demodulation process, it is helpful to understand the modulation technique. A PSK signal is the mix of a PCM bit stream (DATA) and stable sine wave signal (CARRIER). The PCM data value, either LOGIC 1 or LOGIC 0, is contained in the phase of the modulated either $+90^\circ$ or -90° , relative to the stable carrier signal.

Demodulation of the PSK/PCM signal is actually the reverse process. The PSK demodulator circuitry incorporates a phase-locked loop which regenerates the carrier signal in a precise frequency and phase relationship to the incoming PSK signal, mixing the modulated carrier and the regenerated stable carrier signals in a similar device yields the original PCM data.

The 7132 PSK demodulator incorporates a unique Costas Filter which has excellent selectivity characteristics. Extremely narrow bandwidths not achievable with L-C filters are accomplished using simple R-C Butterworth filters. The key to the Costas design is frequency translation of the PSK carrier signal to baseband in the first stages of the demodulator circuitry (Mixers UM2 and 3). This action shifts the carrier center frequency to zero frequency and both the upper and lower data side bands are overlayed. Spurious signals above or below the PSK signal bandwidth are beyond the cutoff point of the low pass filters and, therefore, are rejected.



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4.1 GENERAL, Continued

Refer to Figures 4-3 and 4-4, which illustrate the block diagram of the Costas Demodulator and various signal wave forms. The PSK signal is mixed with two locally generated clock signals in circuits UM2 and UM3. When IN SYNC, the servo action of the phase-locked loop forces the loop to a nulled condition. When the loop is nulled, the PSK and 0° clock zero crossig points are coincident. The resultant of this mix is the original PCM data.

Mixing of the PSK and 90° clock signals results in an error signal (UM3 OUT) used to control the VCO frequency. The output of UM3 is integrated by the action of the Z filter. The error signal generated in UM3 is then phase corrected using the demodulated data polarity in another mixer device, U12. Note the average value of this signal is zero when the loop is nulled. Any phase relationship other than 90° will cause an unbalance in the symetry of UM3 output. The polarity of this signal is such that the VCO frequency is adjusted to drive the loop to a nulled condition.

4.2 PK DEMODULATOR - DETAILED THEORY OF OPERATION

The PSK demodultor consists of four basic subfunctions. Refer to the detailed block diagram, Figure 4-5 and Schematic Drawing #015057.

- o BANDPASS FILTER AND AGC AMPLIFIER
- o DEMODULATOR
- o LOOP FILTER
- o VCO



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4.2.1 Bandpass Filter and AGC Amplifier

The signal enters the demodulator via either source 1 or 2 by energizing the corresponding relay K1 or K2, then through a bandpass filter consisting of R63, C5, C6, L2, C7 and C8. The purpose of this filter is to precondition the input signal prior to entering the input amplifier. The bandpass filter is tuned to $\pm 30\%$ of the carrier center frequency. Note this filter does not determine the input bandwidth of the demodulator.

The input amplifier consists of U1, Q1, Q2 and its associated circuitry. The circuit amplifies the input signal to 0.707 volts p-p. U2 is an unity gain buffer providing the necessary power to drive the mixer devices UM2 and UM3.

Automatic gain control is accomplished by the action of a full wave-rectifier circuit, CR1 and CR2, and one-half of a dual op-amp, U3. This circuit is connected to the demodulator output and senses the average value of the PSK signal. The resulting error signal is fed to the AGC input of U1, PIN 5. The AGC loop has sufficient gain to maintain the output level of the input amplifier relatively constant over the 20 dB input range of the demodulator.

The second half of U3 serves as a voltage comparator and detects when the input signal level is below the required level for demodulation. The output of this detector MIN LEVEL is OR'd into the sync detector circuit.

4.2.2 Demodulator

The demodulator consists of two multiplier devices, UM2, UM3, the low pass filters, shown on schematic sheet 3, a limiter circuit U11 and an output amplifier, shown on schematic sheet 7.

The AGC'd PSK input signal is compared to sine and co-sine clock signals (0° and 90° clock) in UM2 and UM3.

The output of UM3 is an error signal proportional to the phase difference of the PSK and 90° clock signals. A null condition exists when these are exactly 90° apart. A phase difference less than or greater than 90° causes either a positive or negative error signal. This signal is integrated by the low pass filter U5 and amplified by U13 prior to insertion into the loop phase detector.

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4.2.2. Demodulator, Continued

UM2 is the data demodulator device. The PSK and 0° clock signals are compared, resulting in the wave form shown in Figure 4-4C.

The low pass filter, U4, integrates the signal, thus removing the carrier transitions. This signal is then shaped by a high speed limiter device, U11. The linear signal is also amplified and buffered by the output amp shown on schematic sheet 7, to approximately 1.5v p-p for processing by a bit synchronizer or other device.

The low pass filters are tuned by energizing the various relays, thus changing the RC time constant of the active filters. As previously mentioned, the low pass filters give the demodulator a bandpass characteristic. This is accomplished by ZERO BEATING the PSK signal down to baseband then passing it through the low pass filters.

4.2.3. Loop Filter

The loop filter consists of a phase detector, U12, a low pass filter, U15, a tracking limiter, U16, Q13, Q20, CT1, and a sync lock detector circuit, U9.

The Costas Loop, by definition, is a decision directed loop, meaning that the decision made by the demodulator device UM2 (either 1 or 0) is used to direct the polarity of the error signal generated by UM3. The data decision is fed to one port of U12, PINS 7 and 8, and the error signal to U12, PIN 4. This decision direction is necessary because the incoming carrier reverses phase causing the error signal polarity to be reversed. However, the error signal is directed to the correct polarity regardless of data value either 1 or 0.

The error signal is integrated by a low pass filter network and fed to the voltage controlled oscillator to maintain a phase-locked condition.

Tuning the phase-locked loop from the WIDE loop to the NARROW loop (10 to 1 ratio) is accomplished by energizing a relay K12, which places C78 in parallel with C79. This reduces the low pass filter cutoff frequency by 10 and by biasing Q18 on reduces the VCO input sensitivity by 10.

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4.2.3.1 Loop Filter (Tracking Range Clamp)

U16 amplifies the loop error signal to generate LOOP SENSE. This signal drives the front panel deviation meter, the sync lock detector and the tracking range clamp.

The tracking range clamp consists of a full wave rectifier, Q19, Q20, CR14 and CR15, and a photo-coupled variable resistance device, CT1. When the incoming PSK signal is at the designed band edge, either upper or lower, the resulting error signal causes current to flow in the LED of CT1, which in turn, lowers the resistance of CT1, PINS 1 and 3. This action clamps the loop phase detector output and limits the VCO frequency deviation range.

4.2.3.2. Sync Detector

One half of a dual op-amp, U9, is used to detect an IN SYNC condition of the phase-locked loop. This circuit is an AC RMS voltage detector. When the PLL is synchronized, the signal is essentially DC and is not amplified. However, when the PLL is not in LOCK, the loop sense signal is a "beat note", resulting from the products of the nonsynchronous PSK and carrier clock signals. The beat note is rectified and integrated, resulting in a DC level which is compared in the other half of U9, to a fixed bias and gives either a positive or negative output, depending on the sync condition. This output is used as the sync status output and to drive the front panel sync indicator.

4.2.4 VCO (Voltage Controlled Oscillator)

The carrier clock signal is generated by mixing the output of a multivibrator circuit (Q8, Q9) with a crystal oscillator (Q16, Q17). The multivibrator operates at approximately 6% of the center frequency, while the crystal oscillator operates at 194% of center frequency.

A clock filter circuit is used to reject the difference frequency and pass only the sum frequency of the two oscillators. The output of the clock filter is a sine wave at two times the carrier center frequency, which is split into two phases (0° to 90°) at the carrier center frequency. The clock splitter outputs are then fed to the multiplier devices UM2 and UM3, the operation of which has already been discussed.

When units are designed to operate at carrier center frequencies less than 3MHz, or with loop bandwidths greater than 0.03%, the XVCO is not required. The crystal oscillator, mixer UM3, and clock filter circuits are deleted, the multivibrator runs at two times the center frequency and drives the clock splitter directly.

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DETAILED BLOCK DIAGRAM

DPSK "COSTAS" DEMODULATOR

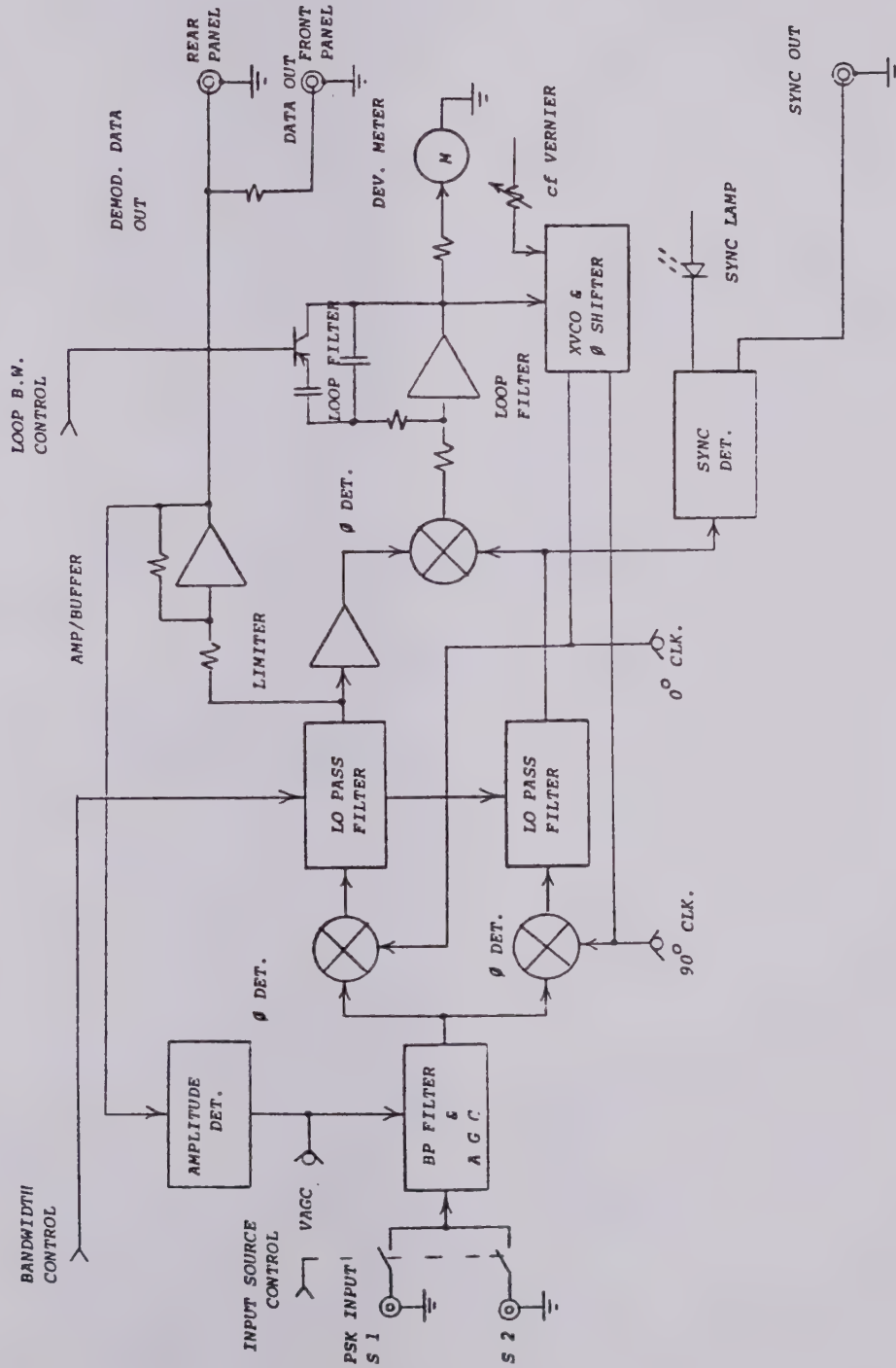
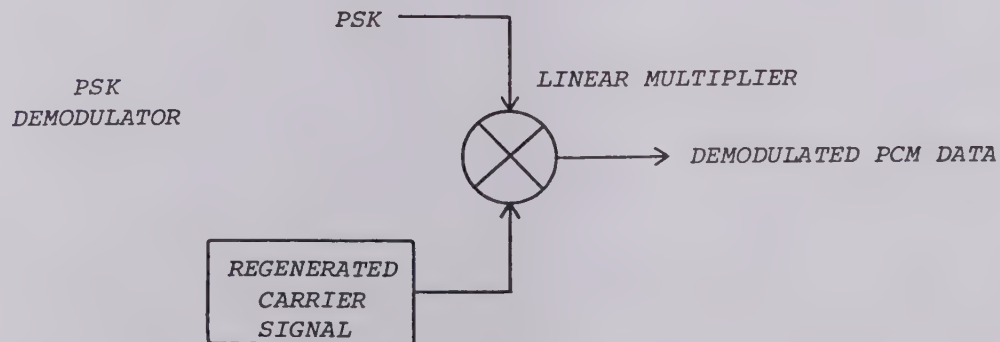
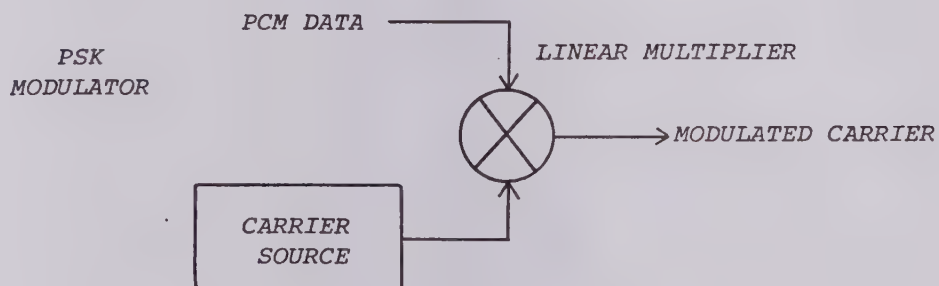
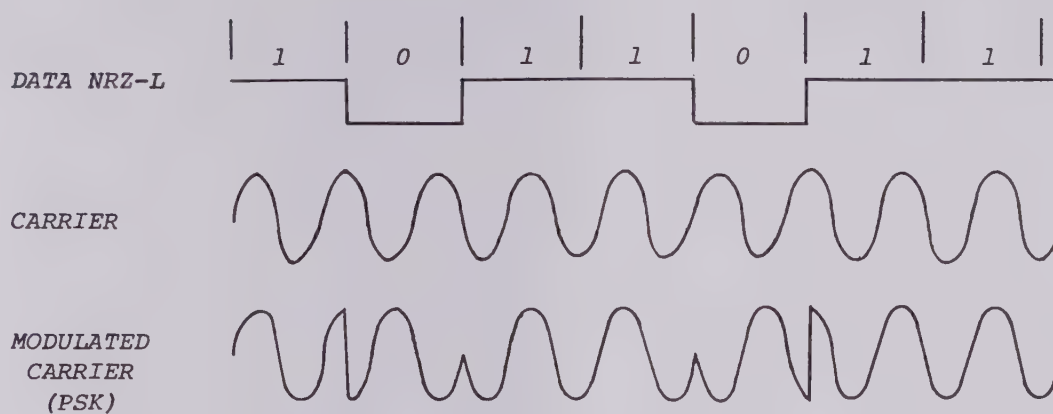


FIGURE 4-1

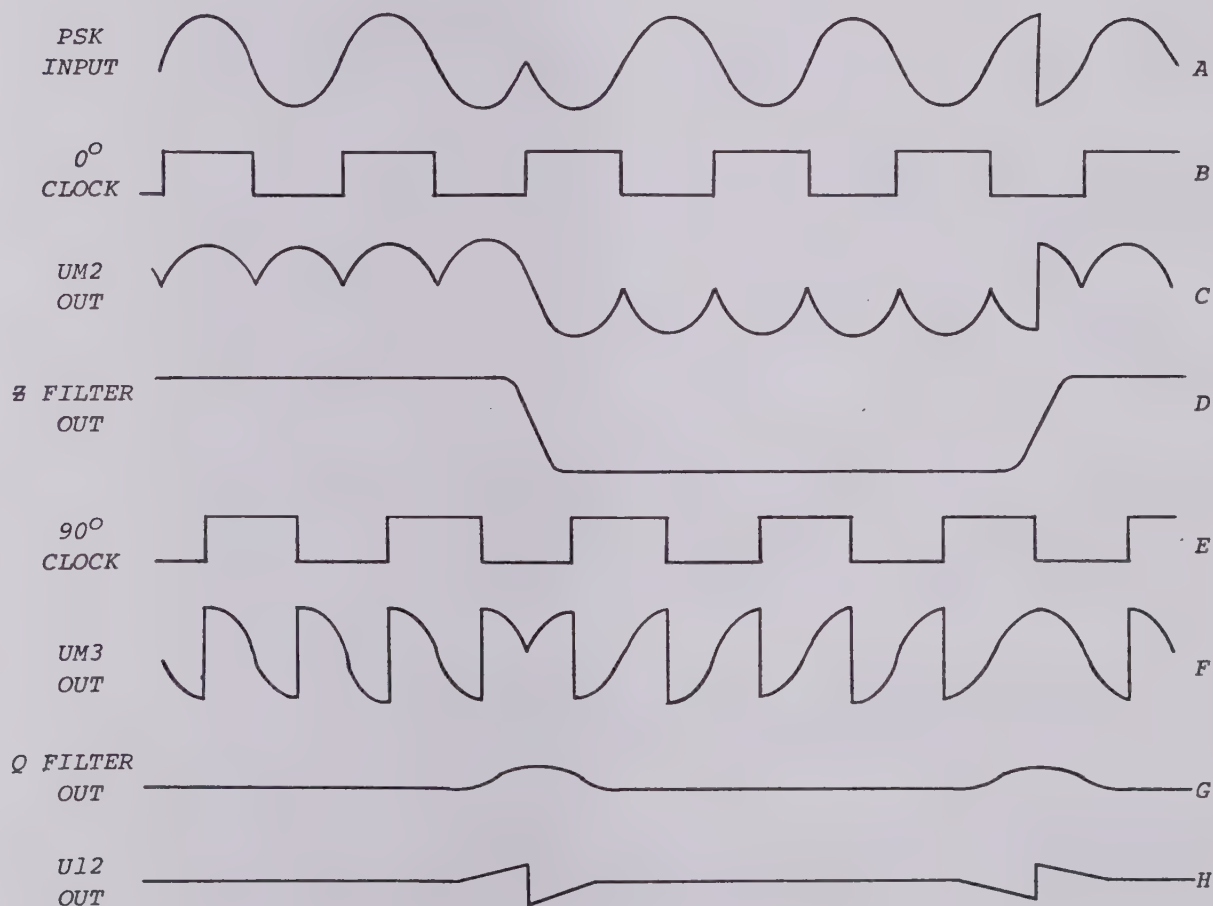
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FIGURE 4-2



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FIGURE 4-4
COSTAS PSK DEMODULATOR
WAVE FORMS



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4.3 NARROW BAND MODULATOR

The narrow band modulator assembly is supplied when the modulator center frequency is within the range of 10KHz to 3MHz.

This function is broken into several sub-functions. Refer to Schematic Drawing #015056 and Block Diagram, Figure 4-3.

- o CARRIER FREQUENCY SOURCE
- o DATA TRANSLATOR AND SIDE BAND FILTER
- o MODULATOR DEVICE
- o MIXER AND OUTPUT BUFFER

4.3.1. Carrier Frequency Source

The carrier frequency source, shown on the lower portion of schematic sheet 2, consists of a crystal oscillator circuit, U1 and U1, and divider circuits, U2 through U4.

The crystal is a series resonant fundamental type and the frequency is always selected between the range of 1 to 10MHz. When the carrier frequency is specified below 1MHz, various divisions of the fundamental frequency are used. The carrier frequency, which is a square wave, enters a low pass filter, is shown on the upper portion of schematic sheet 2 (U5). The purpose of this filter is to convert the carrier signal from square to sine wave by rejecting the odd harmonics in the wave form.

4.3.2 Data Translator and Side Band Filter

This function is shown in the center of schematic sheet 2. The voltage translator consists of two sections of a quad-nand gate (U6) and a resistive network. The purpose of the translator is to prevent variations in the MOD IN signal logic levels from changing the signal level into the modulator device which would change the modulation index.

The side band filter consists of U7 and its associated circuitry. As its name implies, its purpose is to limit the side bands in the carrier signal caused by the odd harmonic components prevalent in any PCM bit stream.

This filter is effectively bypassed by the action of switch devices Q1, Q2, and K1 by disconnection of the filters active elements when the front panel switch is in BYPASS position.

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4.3.2 Modulator Device

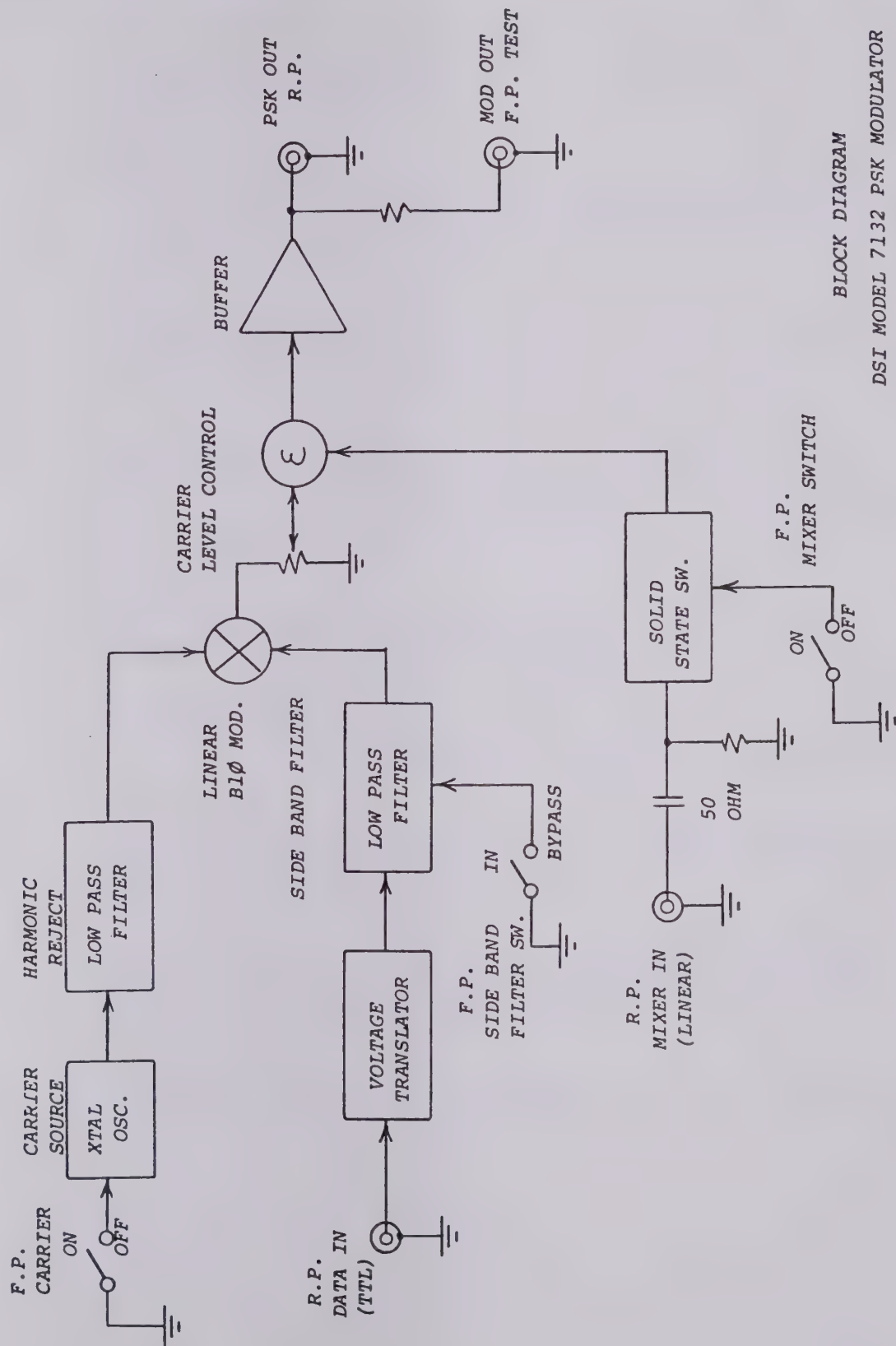
The modulator, shown on the upper-right portion of schematic sheet 2, is a three-port passive mixer. Data polarity reversal at the IF input results in carrier phase reversal out the mixer RF output. Refer to the wave forms shown in Figure 4-2.

4.3.3. Mixer and Output Buffer

The PSK carrier and mix input signals are combined in the amplifier circuit are shown on the upper-left portion of schematic sheet 3. A solid-state switch device, Q3, allows the mix input to pass when it is energized ON.

U9 is a wide band unity gain buffer circuit and provides isolation from the summing amplifier and the output.

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BLOCK DIAGRAM

DSI MODEL 7132 PSK MODULATOR

FIGURE 4-5



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4.4 WIDE BAND MODULATOR ASSEMBLY

4.4.1 Modulator

4.4.1.1. Crystal Oscillator

The PSK carrier source is generated by a crystal oscillator shown at the upper-left portion of schematic sheet 3 and consists of Q7, Q8, and Q9 and its associated circuitry. The oscillator operates at the modulator center frequency.

4.4.1.2. Modulator Device

The PSK signal derived by a mix of the oscillator output and the PCM input data from the side band filter. This is accomplished by M2 shown on the upper-right portion of schematic sheet 3.

4.4.1.3. Output Amplifier

The PSK signal is passed through Q11 (and V3 with the +10 dBm option), shown in the upper portion of schematic sheet 4. The purpose of the output amplifier is to provide an isolated 50 ohm driving source.

4.4.1.4. Mix Input

A mix input is provided to add perturbing interference signals (for testing) or to multiplex other subcarrier signals.

Relay R2, on schematic sheet 3, allows turning the mix signal OFF via a front panel switch.

Mixing occurs at the junctions of R53 and R55, on schematic sheet 4.

4.4.1.5 Side Band Filter

The side band filter limits the PSK side band spectral content by low pass filtering of the PCM data prior to mixing with the carrier signal, the lower portion of schematic sheet 4.

Switch devices Q13, Q14 and K1 may be de-energized via the filter. Note the filter pole buffer, U4, is not bypassed, however, the reactive elements (C52-C54) are removed from the circuit and U4 becomes the wide band unity gain buffer.

4.4.2. Frequency Converter

At center frequencies above 30 MHz the RF input is converted to an intermediate frequency, schematic sheet 2.

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4.4.2.1 Input Filter

A filter, consisting of Q1 and associated circuitry, provides image frequency rejection and rejection to spurious signals out of the data bandwidth.

A buffer circuit, Q2 and Q3, provides impedance isolation from the filter and mixer device.

4.4.2.2. Converter Oscillator

The converter oscillator (Q4-Q6) operates at a frequency equal to $f_o = C_f - IF$. This information is given on the record sheet at the front of this instruction manual.

4.4.2.3. Mixer

A doubly balanced mixer device (M1, schematic sheet 3) is used to mix the input signal "Cf" and converter oscillator signal f_o . The balanced action of M1 rejects Cf and f_o and the remaining products are $-Cf+f_o$ and $Cf-f_o$.

The filtering action of the demod assembly rejects the $Cf+f_o$ product and passes only the $Cf-f_o$ product.

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SECTION V

MAINTENANCE



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5.1

GENERAL

The unit has been calibrated at the factory to the procedure outlined by Drawing #019110 included in this manual.

Recalibration will not normally be required except after replacement of a faulty component. Calibration may be performed on a yearly basis to insure peak performance of the unit.

Maintenance should be performed only by qualified personnel after having thoroughly read the THEORY OF OPERATION and MAINTENANCE Sections of this manual.

CAUTION:

Use particular care when working on or near the AC primary wiring!

5.2

TROUBLE ISOLATION

When a failure occurs in the unit, disconnect the AC power and remove the top and bottom covers. Perform a visual inspection, looking for burned, broken or loose components, loose connectors or broken wires.

If the problem was not uncovered by the visual inspection, perform the following tests in sequence.

5.2.1.

POWER SUPPLY

Check the following points with a DVM.

DEMOM BOARD

PIN

VOLTAGE

12	-15v <u>+50</u> mv
1	+15v <u>+50</u> mv
46	+5v <u>+50</u> mv

Re-adjust the power supply if necessary.

If any of the supply voltages cannot be adjusted to within the tolerance, remove the connectors from the mod and demod PC boards one at a time. If the problem is cured by disconnecting one of the connectors, the circuits on the respective circuit board are causing excessive loading to the power supply, or the supply cannot supply its rated output.

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5.2.1. Power Supply, Continued

To determine if the power supply will deliver its rated load, connect a load resistor across each supply and measure the voltage. This should be done with the connectors from the mod and demod removed.

<u>SUPPLY</u>	<u>MAX LOAD</u>	<u>RESISTOR</u>
+15 v	0.75 A	20 ohm, 15 watt
-15 v	0.75 A	20 ohm, 15 watt
+ 5 v	3.0 A	1.6 ohm, 15 watt

NOTE

2 Watt resistors may be used for this test as long as power is not applied longer than one minute.

If the power supply will not produce the rated output, replace or repair it.

5.2.2. NARROW BAND MODULATOR

When a failure occurs on the modulator assembly, first verify the presence of the PC power voltages on the modulator assembly.

J2 PIN 50	+15 V
J2 PIN 48	-15 V
J2 PIN 1	+ 5 V

If these are not correct, troubleshoot the power supply as described in Paragraph 5.2.1.

5.2.2.1. Set-Up

- o Apply a TTL square to the MOD DATA IN, J9; set the frequency somewhat below the cutoff specified for the side band filter.
- o Apply a 1v p-p sine wave at about 100KHz to the mix in J7.
- o Turn subcarrier switch ON
- o Mix switch OFF
- o Side band filter to BYPASS
- o Connect the MOD OUT, J6, to an oscilloscope via a short coax cable.

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5.2.2.2. Problems, Symptoms and Troubleshooting Steps

A. No Carrier or Mix Output

- 1) Adjust R36 toward maximum gain; the modulator should supply 2v p-p minimum at the carrier center frequency.
- 2) If the NO SIGNAL is present, turn the mix switch ON. The 100KHz signal applied to the mix input should be about 2v p-p. If neither the mix or carrier outputs are present, the problem is in Q7, V9 or its associated circuitry. Also check the cable from the PC assembly to the rear panel.

B. Carrier Output OK, But No Mix Output

- 1) Verify the 1v p-p signal is present at E3 on the modulator PC assembly. If not, check the cable.
- 2) Verify the action of the switch driver circuit U8.

<u>CARRIER SWITCH</u>	<u>U8 - PIN 6</u>	<u>U8 - PIN 7</u>
ON	LOGIC 1	-12 to -15 v
OFF	LOGIC 0	+12 to +15 v

- 3) Check Q3, Q4 and associated components.

C. Carrier Output Present, But Not Modulated

- 1) Check the modulating signal at U7, PIN 4 $\approx$ 0.6v p-p balanced around zero volts. If this signal is present, the problem is U1, otherwise proceed.
- 2) Verify the modulating signal is present at U6, PIN 2, 5.
- 3) Verify the carrier is enabled, LOGIC 1 at U6, PIN 1, 4.
- 4) Based on these readings, troubleshoot the suspect area U6 or U7 and associated circuits.
- 5) Also verify the action of the side band filter. When the side band switch is in BYPASS position, the signal at U7, PIN 4 should be a square wave. When IN should appear filtered. If not, verify the control signals:

	<u>U6, PIN 9</u>	<u>U8, PIN 1</u>	<u>U6, PIN 8</u>
BYPASS:	LOGIC 0	+12v MIN	LOGIC 1
IN:	LOGIC 1	-12v MIN	LOGIC 0



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5.2.2.2. Problem, Symptoms and Troubleshooting Steps, Continued

D. No Carrier Output But Mix Output OK

1) Verify the following signals:

U7, PIN 4 $\approx$ 0.6v p-p Data
 UM1, PIN 8 $\approx$ 0.5v p-p Unmodulated Carrier
 UM1, PIN 1 $\approx$ 0.4v p-p Modulated Carrier

If the data and unmodulated signals are OK, but not the modulated signal at UM1, PIN 1, the problem is UM1.

2) If there is no signal present at UM1, PIN 8, check the crystal oscillator and divider circuits Y1, U1 through U4; Check the harmonic filter, U5, and associated circuits, and also verify the carrier enable signal is LOGIC 1 when the carrier switch is ON.

5.2.3 PSK Demodulator Trouble Isolation

Troubleshooting of the PSK demodulator should be done only after thoroughly reading the THEORY OF OPERATION and with the aid of Schematic Drawing #015057 and Assembly Drawing #012057 in this manual.

5.2.3.1. Quick Look Trouble Isolation

When a trouble occurs in the 7132 demodulator section, extend the unit outward as far as the slides will permit and remove the top cover. It may be more convenient to remove the unit completely from the rack and perform testing on a separate bench.

A. Apply a modulated PSK signal to S1 of the 7132 and set the source switch to POSITION 1. The PSK signal center frequency must be within the capture range of 7132 demodulator, $C_f \pm 3X$ the loop bandwidth. Refer the record sheet at the beginning of this manual.

NOTE

If the 7132 includes a modulator option, the internal modulator may be used for this purpose; otherwise, use a DSI Model 7121 PSK/PCM Simulator or similar device.

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5.2.3.1 Quick Look Trouble Isolation, Continued

- B. Set the input signal amplitude to $\approx 150\text{mv}$ p-p.
- C. Set the BW to position 4 and loop switch to WIDE position.
- D. Set the modulation rate of the simulator to be compatible with the selected input bandwidth.

NRZ CODES	.5	X	INPUT BANDWIDTH
BIØ OR DM	.25	X	INPUT BANDWIDTH

NOTE

If the 7132 includes the modulator option, it may be used to troubleshoot the demodulator. A square from any convenient source may be used as the modulating signal. Set the square wave level to be within the range of 0 to 0.4v for LOGIC 0 and 2.4 to 5.0v for LOGIC 1. Set the frequency to .25 X the selected input bandwidth.

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TEST #	MONITOR POINT	TEST INSTRU.	SIGNAL	PROBABLE TROUBLE AREA	NOTE
1	Conn. P 35 Conn. P 12 Conn. P 46	DVM DVM DVM	+15 V -15 V +5 V	Power supply or wiring	
2	TP3	Scope	.707 V p.p. PSK Signal	- Input circuitry U1, 2, 4-5, 13, Q1, 2. - VCO Section Q5-17, U6, 7, 8 or 10 - Limiter U11 - Loop $\emptyset$ Det U12 - Loop Filter U15, 16 - Output Amp. Q21-25 - AGC Amp. U3	- If not present, ground the junction of R24, CR3. This forces the input gain to max. The voltage should be $\approx 4V$ p.p. - If significantly $\geq .707 V$, the AGC signal is not being generated.
3	Q9 Col.	Scope	5 V p.p. square wave	- VCO Q5-Q9 - VCO Ref. supply U10, Q14, Q15, CR9	Freq. 2x Cf for units without XVCO section, 6% of Cf with XVCO section. If OK, proceed.
4	Junction C69, 70	Scope	1 V p.p. at frequency of 194% Cf	Xtal Osc. Q16, Q17, Y1	Perform this test only for units with XVCO.
5	E16	Scope	2 V p.p. sine wave at 2x Cf	- Mixer UM1 - Clock Filter Q10-Q13	"
6	U7 P2	Scope	.6 V p.p. sp. wave at Cf	U6, U7	
7	U8 P2	Scope	.6 V p.p. sp. wave at Cf	U6, U8	



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TEST #	MONITOR POINT	TEST INSTRU.	SIGNAL	PROBABLE TROUBLE AREA	NOTE
8	TP1	Scope	≈ 200 MV p.p. Demodulated Data	- Demodulator device UM2 - Filter Buffer U4	Balanced around ground level.
9	DEMODO OUT J8	Scope	1.5 V p.p.	Output Amp. Q21-24	Same signal as in test 8, except amplified.



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5.3

WIDE BAND MODULATOR ASSEMBLY

When a failure occurs on the wide band modulator assembly, first verify the presence of the DC power voltages on the wide band modulator assembly.

J2, PIN 50 +15v +50mv
 J2, PIN 48 -15v +50mv
 J2, PIN 1 + 5v +50mv

If not correct, troubleshoot power supply as described in Paragraph 5.2.1. in this manual.

5.3.1. Modulator

5.3.1.1. Set-Up

- o Apply a TTL square wave to MOD IN, J9 of the rear panel, frequency somewhat below the specified filter cutoff frequency.
- o Apply a 0.5v p-p sine wave, @ ~100KHz to MIX IN, J7 of the rear panel.
- o Turn subcarrier switch ON
- o Turn mix switch OFF
- o Sideband filter switch to BYPASS
- o Connect MOD OUT, J6 of the rear panel, to the oscilloscope via a terminated 50 ohm coax cable.

5.3.1.2. Problem, Symptoms and Troubleshooting Steps

A. No Carrier or Mix Outputs

- 1) Adjust R54 toward maximum gain, the modulator should supply 65mv p-p or 2v p-p with +10 dBm option.
- 2) If not signal is present, turn mix switch ON. The 100KHz signal should be as described above in step A-1.

If neither signal is present, the problem is Q11, U3 or associated circuitry. Also check the cable between E5 and E6 to the 7132 rear panel, J6.



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5.3.1.2. Problems, Symptoms and Troubleshooting Steps, Continued

B. Carrier OK But No Mix Signal

- 1) Verify the 100KHz signal is present at E3, if not, check cable.
- 2) Verify the 100KHz signal is present at K2, PIN 1 ($\approx 0.25v$ p-p). If not, check K2, U13 and control signal to U15 (U13, PIN 1) should be LOGIC 1 with the mix switch ON.

C. Carrier signal OK But Not Modulated

- 1) Check modulating signal @ M2, PIN 3, should be 0.5v p-p balanced around ground. If not, troubleshoot rear-ward checking: U1, U4, Cable rear panel J9 to J1, PIN 22; Carrier enable signal U1, PIN 12; and wiring to carrier switch ON.

D. No Carrier Output But Mix OK

- 1) Check signal at M2, PIN 8, should be $\approx 0.5v$ p-p at the modulator center frequency. If not, check oscillator circuitry Q7 through Q10.

5.3.2 Frequency Converter

If a problem is suspected in the frequency converter, first bypass the converter by operating the 7132 in S2 (at the time of IF frequency).

A. Connect an unmodulated sine wave to S2 (J5 rear panel) and select S2 from the front panel switch.

- o AMPLITUDE - 22mv RMS
- o FREQUENCY - IF (See record sheet)

If the demod assembly is OK it will synchronize as evident by the sync lamp. Also monitor the demod out front panel test point. When in LOCK to an unmodulated sine wave, this signal will be a DC level of $\approx +1v$.

B. Perform the same test as step A but using Cf and J4. If A. works, but not B., the problem is in the frequency converter circuitry.

- 1) Monitor Q3 with an oscilloscope, signal should be 44mv RMS @ Cf. If not troubleshoot:
 - BUFFER CIRCUIT - Q2 and Q3
 - INPUT FILTER - Q1
 - CABLE - J4 to E7 and E8
- 2) Monitor Q6 with an oscilloscope, the signal should be $\approx 3v$ p-p at the oscillator frequency. If not, troubleshoot the buffer stage Q6 and oscillator circuitry Q4 and Q5.

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SECTION VI

DRAWINGS/PARTS LISTS



DECOM SYSTEMS INC.

DRAWING AND PARTS LISTS

010096	TOP ASSEMBLY
010099	REAR PANEL ASSEMBLY
010135	FRONT PANEL ASSEMBLY
010362	POWER SUPPLY ASSEMBLY
012056	NARROW BAND MOD ASSEMBLY
012057	DEMOD BOARD ASSEMBLY
012060	WIDE BAND MOD ASSEMBLY
012182	NARROW BAND DEMOD ASSEMBLY
012646	GPIB BOARD ASSEMBLY
012697	NOTCH FILTER ASSEMBLY

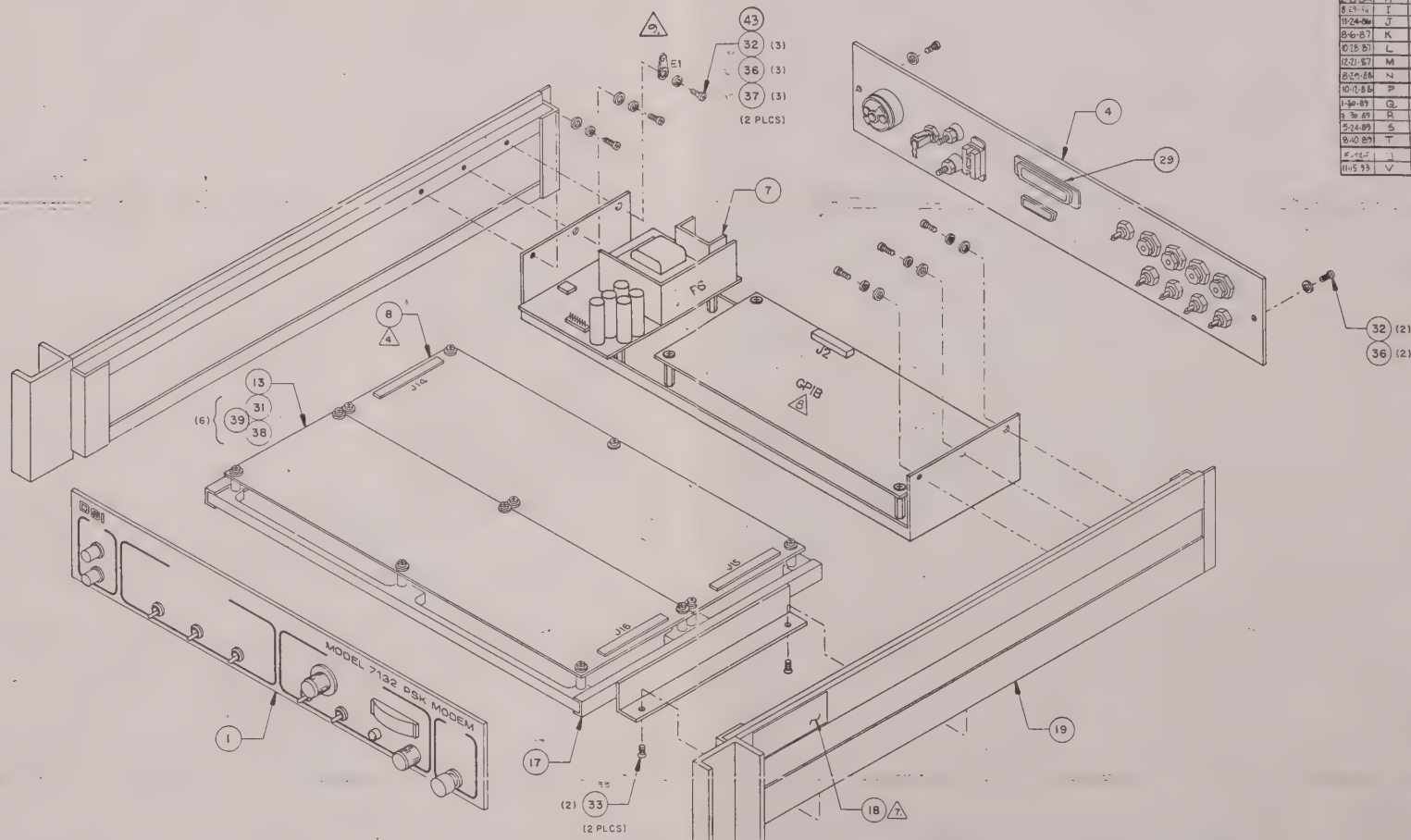
SCHEMATICS

015056	NARROW BAND MOD SCHEMATIC
015057	DEMOD BOARD SCHEMATIC
015060	WIDE BAND MOD SCHEMATIC
015150	NARROW BAND DEMOD SCHEMATIC
015423	GPIB SCHEMATIC

OTHER

019110	ACCEPTANCE TEST PROCEDURE
--------	---------------------------





△ ROUTE WIRE FROM E1 TO THE REAR PANEL J1-GND. AS SHORT AS POSSIBLE.

△ GPIB, BD & HARDWARE NOT INCLUDED FOR STD, -1 THRU -5 CONFIGURATIONS.

△ AFFIX APPROX AS SHOWN

6. TOP & BOTTOM COVERS OMITTED FOR CLARITY

5. SIGNAL CONNECTOR COMPONENTS (ITEMS 21, 22, & 23) & POWER CORD ASSEMBLY (ITEM 20) PACKAGED SEPARATELY

△ SEE CONFIGURATION TABLE FOR OPTIONAL BOARD (ADD ITEMS 31, 38 & 39 (QTY-6)).

3. FOR WIRE LIST SEE # 017064

2. APPLY ADHESIVE (ITEM 44) TO ALL SCREW THREADS

1. ASSEMBLE PER DSI WORKMANSHIP MANUAL # 005

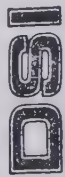
NOTES: UNLESS OTHERWISE SPECIFIED

7132-01000	010096-12	NARROW BAND MOD
7132-11000	010096-11	WIDE BAND DEMOD & N.B. MOD W/ SPEG GPIB
7132-11001/21001/31001	010096-10	WIDE BAND DEMOD & N.B. MOD W/ GPIB
7132-41001	010096-9	NARROW BAND MOD & DEMOD & GPIB
7132-22001	010096-8	WIDE BAND MOD & DEMOD & GPIB
7132-20001	010096-7	WIDE BAND DEMOD & GPIB
7132-40001	010096-6	NARROW BAND DEMOD & GPIB
7132-40000	010096-5	NARROW BAND DEMOD
7132-41000	010096-4	NARROW BAND DEMOD & NARROW BAND MOD
7132-1200/2200/3200/1300/2300/3300	010096-3	WIDE BAND DEMOD & WIDE BAND MOD
7132-1100/2100/3100	010096-2	WIDE BAND DEMOD & NARROW BAND MOD
7132-1020/2020/3020	010096-1	WIDE BAND DEMOD & SIGNAL SPLITTER
7132-1000/2000/3000	010096-STD	WIDE BAND DEMOD
MODEL *	DASH *	DESCRIPTION

CONFIGURATION TABLE

DATE	REV	DESCRIPTION	APPROVED
4-21-82	D	D-0844	
4-29-83	E	D-1038	
7-15-83	F	D-1284/D-1288 → D-1583	
8-15-83	G	D-1529 → D-1529/1529	
2-8-84	H	D-1620 KWT → D-1620	
8-13-84	I	D-1929	
10-24-84	J	ECO D-2018 GH	
8-6-87	K	ECO D-1367 GH	
6-18-87	L	ECO D-1090 GH	
12-31-87	M	ECO D-1522 GH	
8-24-88	N	ECO D-1095, D-2099 GH	
10-1-88	P	ECO D-1719 GH	
1-30-89	Q	ECO D-1760	
3-30-89	R	ECO D-1919, D-2931	
5-14-89	S	ECO D-2999, D-2995, 3040	
8-10-89	T	ECO D-3059 GH	
2-1-90	U	ECO D-3059	
11-5-93	V	ECO-4319 1200 GH	

DSI DECOM SYSTEMS INC.	
340 RANCHERO DR. SAN MARCOS, CALIF. 92689	
SADIE 4-21-82	
7132	
PSK MODEM	
55744	
010096	



FSCM
55744

PARTS LIST

PL NO. 010096

REV. V

TITLE ASSEMBLY
PSK MODEM

DISK
11/16/93

APP. BY *J. P. [Signature]*
DATE 5/14/83

DWN. BY GLG
DATE 4-1-82

SHEET
OF 3

LTR	REVISIONS	DWN	DATE	NEXT ASSY. END ITEM	NEXT PL. END ITEM	MODEL NO.
A	D-0291	FWC	1-11-79			
B	D-0584	FWC	7-28-80			
C	D-0672	FWC	3-5-81			
D	D-0844	FWC	2-16-82			
E	D-1038	FWC	4/29/83			
F	D-1284 & D-1288 ✓ <i>APR 8-1-83</i>	GLG	7-15-83			
G	D-1309 ✓ <i>APR 9-2-83</i>	GLG	8/16/83			
H	D-1420 ✓ <i>APR 2-1-84</i>	KWT	2/7/84			
I	INCORP ECO D-1929	GH	9/2/86			
J	INCORP ECO D-2018	GH	11/24/86			
K	INCORP ECO D-2367	JP	8/7/87			
**	REPRINTED DOCUMENT	FWC	8/28/87			
L	INCORP ECO D-2490	GH	10/28/87			
M	INCORP ECO D-2522	GH	12/22/87			
N	INCORP ECO D-2698, D-2699	GH	9/22/88			
P	INCORP ECO D-2729	GH	11/1/88			
Q	INCORP ECO D-2760	JCT	1/31/89			
R	INCORP ECO D-2919, D-2931	JCT	3/30/89			
S	INCORP ECO D-2993, D-2999, D-3040 ✓ <i>APR 8-1-83</i>	GH	7/24/89			
T	INCORP ECO D-3059	GH	8/17/89			
U	INCORP ECO D-3707	GH	5/17/91			
V	INCORP ECO 4313 ✓ <i>APR 8-1-83</i>	GH	11/16/93			
REFERENCE DRAWINGS						
	DWG NO.					TITLE
	017064					UNIT WIRE LIST
	018002					UNIT MANUAL
	017051					UNIT WIRE LIST FOR -1 CONFIGURATION
CONFIGURATION TABLE						
	MODEL #		DASH #			DESCRIPTION
7132-01000	010096-12					NARROW BAND MOD ONLY
7132-11000	010096-11					WB DEMOD & NB MOD W/GPIB & SPECIAL PROM
7132-11001/21001/31001	010096-10					WIDE BAND DEMOD & NARROW BAND MOD W/GPIB
7132-41001	010096-9					NARROW BAND DEMOD & MOD W/GPIB
7132-22001	010096-8					WIDE BAND DEMOD & MOD W/GPIB
7132-20001	010096-7					WIDE BAND DEMOD W/GPIB
7132-40001	010096-6					NARROW BAND DEMOD W/GPIB
7132-40000	010096-5					NARROW BAND DEMOD
7132-41000	010096-4					NARROW BAND DEMOD & NARROW BAND MOD
7132-1200/2200/3200	010096-3					WIDE BAND DEMOD &
-1300/2300/3300						WIDE BAND MOD
7132-1100/2100/3100	010096-2					WIDE BAND DEMOD & NARROW BAND MOD
7132-1020/2020/3020	010096-1					WIDE BAND DEMOD & SIGNAL SPLITTER
7132-1000/2000/3000	010096-STD					WIDE BAND DEMOD



PARTS LIST

TITLE	ASSEMBLY
1. <u>Introduction</u>	
2. <u>Objectives</u>	
3. <u>Scope</u>	
4. <u>Methodology</u>	
5. <u>Results and Discussion</u>	
6. <u>Conclusion</u>	
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148. <u>Appendix</u> </	

PSK MODEM

DISK

11/16/93

DRAWN G. GADDIE

DATE 4/1/82

PARTS LIST NO.

010096

REVISION

V

ITEM NO.	STD	QTY												PART NUMBER	DESCRIPTION	REFERENCE DESIGNATOR	FSCM NO.
		-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12				
1	1	-	1	1	1	1	1	1	1	1	1	1	1	FRONT PANEL ASSY	010135		55744
	-	1	-	-	-	-	-	-	-	-	-	-	-	FRONT PANEL ASSY	010097		55744
4	1	1	1	1	1	1	-	-	-	-	-	-	1	REAR PANEL ASSY	010099	J13	55744
	-	-	-	-	-	1	1	1	1	1	1	1	-	REAR PANEL ASSY	010099-2		55744
7	-	-	-	-	-	1	1	1	1	1	1	-	-	PWR SPLY W/GPIB	010362-1		55744
	1	1	1	1	1	-	-	-	-	-	-	-	1	PWR SPLY ONLY	010362-STD		55744
	-	-	-	-	-	-	-	-	-	-	-	-	-	PWR SPLY W/GPIB	010362-2		55744
8	-	-	1	-	1	-	-	-	-	1	1	1	-	NARROW BAND MOD	012056	J14, J15	55744
	-	-	-	-	-	-	-	-	-	-	-	-	1	NARROW BAND MOD	012056-1	J14, J15	55744
	-	1	-	-	-	-	-	-	-	-	-	-	-	SIGNAL SPLITTER	002011	J15	55744
	-	-	-	1	-	-	-	1	-	-	-	-	-	WIDE BAND MOD	012060	J14, J15	55744
13	1	1	1	1	-	-	-	1	1	-	1	1	-	DEMOM ASSY	012057	J16	55744
	-	-	-	1	1	1	-	-	-	1	-	-	-	NARROW BAND DEMOD	012182	J16	55744
17	1	1	1	1	1	1	1	1	1	1	1	1	1	CARD FRAME ASSY	010220		55744
18	1	1	1	1	1	1	1	1	1	1	1	1	1	LABEL, UNIT ID	011248		55744
19	1	1	1	1	1	1	1	1	1	1	1	1	1	CHASSIS, 3 1/2"	010110	BUCKEYE	55744
20	1	1	1	1	1	1	1	1	1	1	1	1	1	POWER CORD ASSY	012233		55744
21	1	1	1	1	1	1	-	-	-	-	-	-	-	CONNECTOR	DD50P	J13	91146

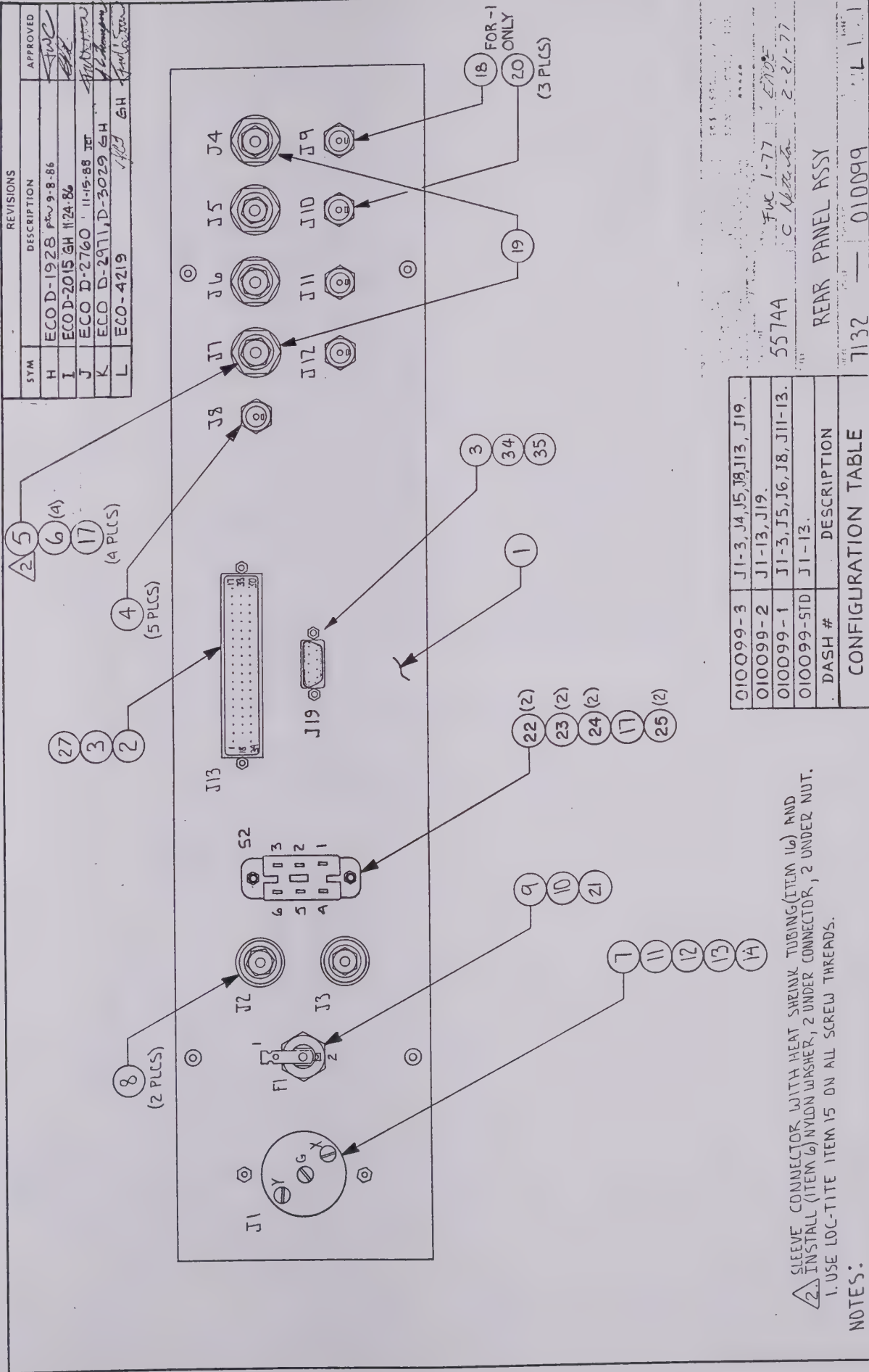
019830-891



PARTS LIST

														PARTS LIST										PARTS LIST NO. 010096		REVISION V
TITLE		ASSEMBLY PSK MODEM												DISK 11/16/93		DRAWN G.GADDIE	SHEET 3									
ITEM NO.		STD	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	QTY	PART NUMBER	DESCRIPTION	REFERENCE DESIGNATOR	FSCM NO.							
22		1	1	1	1	1	1	-	-	-	-	-	-	-	-	554190	SCREW LOCK ASSY DD, CONN	J13	91146							
23		1	1	1	1	1	1	-	-	-	-	-	-	-	-	554220	HOOD, CONN	D24661	91146							
24		1	2	3	3	3	1	2	2	4	4	4	4	3	3	554300	CONNECTOR	PGB25A	91146							
27		50	100	150	150	150	50	100	100	200	200	200	200	150		556090	TERMINAL, CRIMP 100-71126S-15	J14, J15, J16	81312							
31		6	12	12	12	12	6	10	10	16	16	16	16	12		586155	SCREW, S/S PPH 6-32 x 5/8		96906							
32		8	8	8	8	8	8	8	8	8	8	8	8	8		586140	SCREW, S/S PPH 6-32 x 3/8		96906							
33		4	4	4	4	4	4	4	4	4	4	4	4	4		586270	SCREW, S/S PPH 6-32 x 1/4		96906							
36		7	7	7	7	7	7	7	7	7	7	7	7	7		588180	WASHER, FLAT #6		96906							
37		6	6	6	6	6	6	6	6	6	6	6	6	6		588191	WASHER, LOCK, SPLIT #6		96906							
38		6	12	12	12	12	6	12	12	12	12	12	12	12		590100	WASHER, NYLON SHOULDER #6		96906							
39		6	12	12	12	12	6	12	12	12	12	12	12	12		590112	SPACER, NYLON 1/4 x #6		83330							
40		1	1	1	1	1	1	1	1	1	1	1	1	1		554263	CONN, TERM HSN 09-50-0106	(3 POS)	27264							
41		1	1	1	1	1	1	1	1	1	1	1	1	1		554265	CONN, TERM HSN 09-50-3071	(7 POS)	27264							
42		8	8	8	8	8	8	8	8	8	8	8	8	8		554264	TERMINAL, CRIMP 08-50-0106		27264							
43		1	1	1	1	1	1	1	1	1	1	1	1	1		590050	LUG, TERM RING, #6 51205-6300	E1	79061							
44		A/R	A/R	A/R	A/R	A/R	-	A/R	A/R	A/R	A/R	A/R	A/R	A/R		590410	ADHESIVE, LOCTITE		05972							

REVISIONS		
SYM	DESCRIPTION	APPROVED
H	ECO D-1928 p/w 9-8-86	<i>[Signature]</i>
I	ECO D-2015 GH 11-24-86	<i>[Signature]</i>
J	ECO D-2760 11-15-88	<i>[Signature]</i>
K	ECO D-2971, D-3029 GH	<i>[Signature]</i>
L	ECO-4219	<i>[Signature]</i>



Q10099-3	J1-3, J4, J5, J8, J13, J19.
Q10099-2	J1-13, J19.
Q10099-1	J1-3, J5, J6, J8, J11-13.
Q10099-STD	J1-13.
DASH #	DESCRIPTION
CONFIGURATION TABLE	

1. SLEEVE CONNECTOR WITH HEAT SHRINK TUBING (ITEM 16) AND
 2. INSTALL (ITEM 16) NYLON WASHER, 2 UNDER CONNECTOR, 2 UNDER NUT.
 1. USE LOC-TITE ITEM 15 ON ALL SCREW THREADS.

NOTES:

REAR PANEL ASSY

7132 — 010099

55744

FOR 1-77

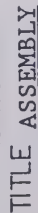
C 16-77

2-27-77

FSCM
55744

PARTS LIST

FSCM 55744		DSI		PARTS LIST				PARTS LIST NO. 010099		REVISION L
TITLE ASSEMBLY										SHEET 2
REAR PANEL										
ITEM NO.	STD	QUANTITY				PART NUMBER	DESCRIPTION	REFERENCE DESIGNATOR	FSCM NO.	
		-1	-2	-3	-4					
1	1	1	1	1		477401	PANEL	011401	55744	
2	1	1	-	-		554120	CONNECTOR	DD50-S-F179	91146	
3	2	2	4	4		554170	JACK SCREW	D20418-2	91146	
4	5	4	5	1		556010	CONNECTOR, BNC	31-010	02660	
5	4	2	4	2		556015	CONNECTOR	86350	02660	
6	16	8	16	8		590125	WASHER, NYLON	5610-174-15	86928	
7	1	1	1	1		556070	RECEPTACLE, POWER	7486	83315	
8	2	2	2	2		556100	BINDING POST	257-103	83330	
9	1	1	1	1		560300	FUSE HOLDER	342004	95915	
10	1	1	1	1		560350	FUSE	3AG1/2ASB	95915	
11	2	2	2	2		586140	SCREW, SS, PPH	6-32 x 3/8	96906	
12	2	2	2	2		588180	WASHER, FLAT	#6	96906	
13	2	2	2	2		588190	WASHER, LOCK	#6	96906	
14	2	2	2	2		588290	NUT, HEX	6-32	96906	
15	A/R	A/R	A/R	A/R		590410	ADHESIVE, LOCTITE		05972	
16	A/R	A/R	A/R	A/R		590995	SLEEVEING, SHRINK	1/2 INCH	51705	
17	1	1	1	1		546500	SWITCH, 110/220 V	S2	82389	
18	-	1	-	4		556040	HOLE PLUG	3/8 INCH	83330	
19	-	4	-	3		556047	HOLE PLUG	1/2 INCH	83330	
20	-	3	-	-		590020	SOLDER LUG	1497-1	83330	
21	1	1	1	1		560345	FUSE	3AG1/4ASB	95915	
22	2	2	2	2		586070	SCREW, SS, PPH	4-40 x 3/8	96906	
23	2	2	2	2		588060	WASHER, FLAT	#4	96906	
24	2	2	2	2		588080	WASHER, LOCK, INT STAR	#4	96906	



TITLE ASSEMBLY

REAR PANEL

PARTS LIST.

DISK

3/14/94

DRAWN G. GADDIE

DATE 3/29/83

ITEM	QUANTITY
1	1
2	1
3	1
4	1
5	1
6	1
7	1
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9	1
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98	1
99	1
100	1

NO.	STD	-1	-2	-3	-4
1	10	10	10	10	10
2	20	20	20	20	20
3	30	30	30	30	30
4	40	40	40	40	40
5	50	50	50	50	50
6	60	60	60	60	60
7	70	70	70	70	70
8	80	80	80	80	80
9	90	90	90	90	90
10	100	100	100	100	100

PART
NUMBER

DESCRIPTION

NUT, HEX, SMALL

4-40 | S2

CABLE ASSEMBLY, GPIB-RP

J13

REFERENCE DESIGNATOR

FSCM NO.

906

55744

CONNECTOR, 9-PIN

519

91146

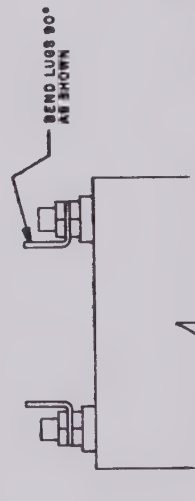
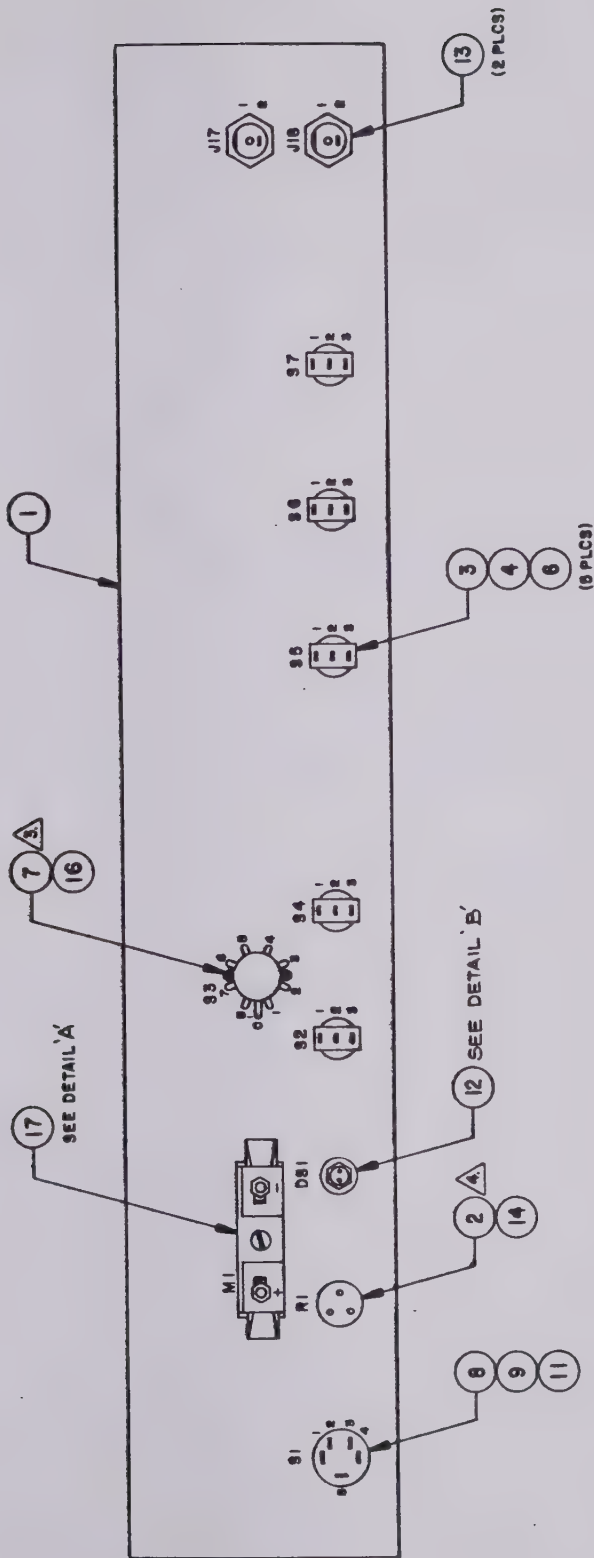
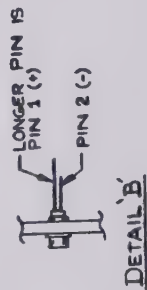
CONTACT, SOCKET

619

91146

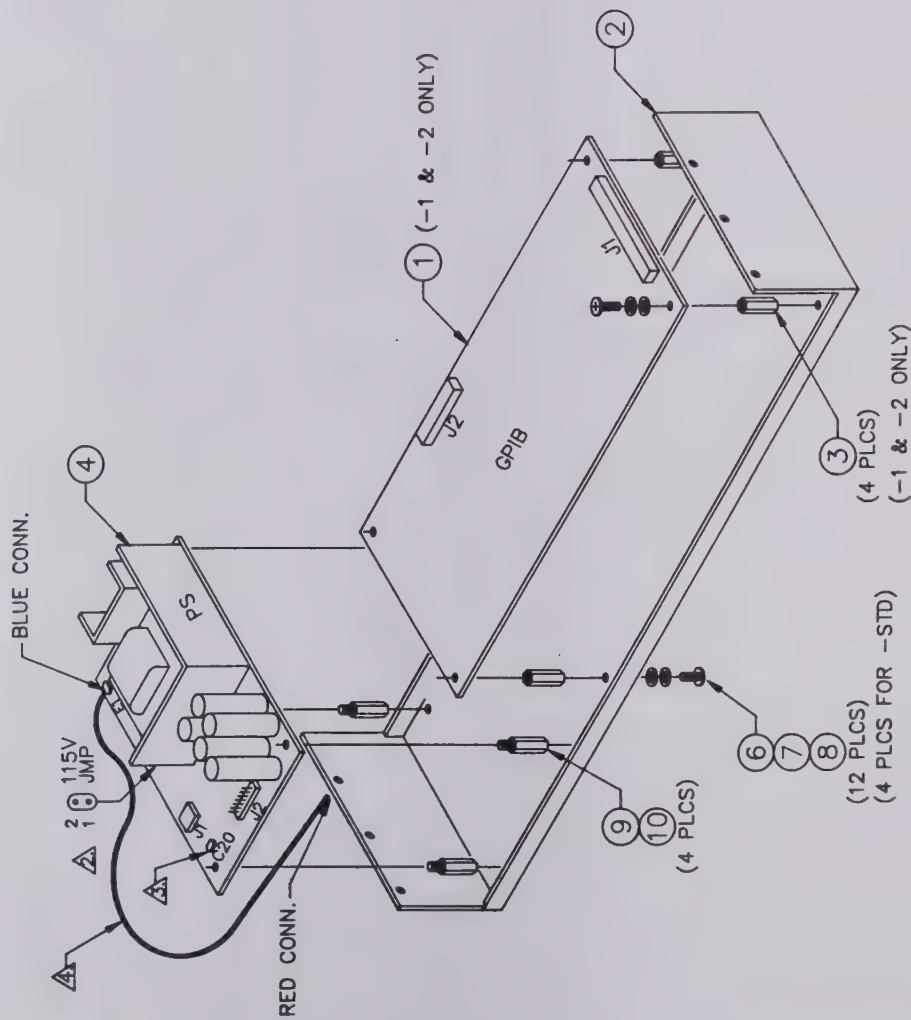
019853 (11/90)

DATE	SYM	DESCRIPTION	APPROVED
11-15-80	A	INCORP ECO D-0820 REDRAW & REVISE P/L	
	B	ECO D-2760	



- NOTES:**
- SEE PART FOR PIN NO. DESIGNATION
 - SET SHAFT TO BUZZ PINS C & 4, INSTALL IN PANEL W/KNOS IN POSITION 1
 - FOR WIRE LIST SEE NO. 017064
 - ASSEMBLE PER DSI WORKMANSHIP MANUAL NO. 005

DBI DECOM SYSTEMS INC. 800 RANCHERO DR. SAN MARCOS, CALIF. 92068 DATE: 12-18-81 DRAWN: [Signature] CHECKED: [Signature]	
TITLE: ASSY DWG FRONT PANEL PART NO: 010135 REV: 1	
7132 010135	



-2: P.S. W/SPECIAL GPIB BD
-1: P.S. W/GPIB BD
STD: P.S. ONLY

STD, -2 SHOWN

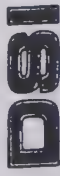
- ▲ CONNECT THE SUPPLIED JUMPER CONNECTOR (BLUE) TO THE SAFETY GND POST,
 CONNECT THE OPPOSITE END OF JUMPER (RED) TO THE SIDE BRACKET AS SHOWN.
 ▲ REMOVE JUMPER ● C20 & ADD .47 100V CERAMIC CAP (ITEM 12) IN ITS PLACE.
 ▲ SOLDER SEPARATE 3.5 FT OF 22 AWG WHT WIRE
 TO 115VJUMP-1 & 115VJUMP-2 (2 WIRES).

1. ASSEMBLE PER DSI WORKMANSHIP MANUAL NO. 005.

NOTES--

010226	7376	USED ON
010094	7136	
010096	7132	

QTY 125	PRICE 172	UNIT OR IDENTIFYING NO.	CONTRACT NO.	PARTS LIST		 DBI BECON SYSTEMS INC. 1000 E. 10TH AVE. SUITE 100 • CHANDLER, AZ 85226		
OTHER DIMENSIONS SPECIFIED UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES FRACTIONS DECIMALS ETC.			DRAWING NO. 3-31-89 CHECKED BY W. S. BAKER 11/8/89		DATE 3-31-89		ASSEMBLY POWER SUPPLY	
MATERIAL			SCALE 1/4" = 1"		DIMS NO. 010362		REV. E	
DO NOT SCALE DRAWING							SHEET 1 OF 1	



FSCM
55744

PARTS LIST

PL NO. 010362

REV. F

TITLE ASSEMBLY

POWER SUPPLY ASSEMBLY

DISK

5/13/92

APP. BY *[Signature]*

DATE 9/28/88

DWN. BY FWC

DATE 9/8/88

SHEET

2 OF 2

LTR

REVISIONS

NEXT ASSY.
VARIOUS

NEXT PL.
VARIOUS

MODEL NO.
7132/7136/7376

- P1 PRELIMINARY RELEASE
- P2 PRELIMINARY RELEASE
- A PRODUCTION RELEASE
- B INCORP ECO D-2760
- C INCORP ECO D-2931
- D INCORP ECO D-3040
- E INCORP ECO D-3059
- F INCORP ECO 3963

[Signatures]

DWN

DATE

- KK 9/8/88
- JCT 9/15/88
- FWC 9/28/88
- JCT 1/31/89
- JCT 3/30/89
- GH 7/24/89
- GH 8/17/89
- GH 5/13/92

REFERENCE DRAWINGS

DWG NO.

TITLE

- 2 = POWER SUPPLY ASSEMBLY W/GPIB BOARD AND SPECIAL CONTROL PROM
- 1 = POWER SUPPLY ASSEMBLY W/GPIB BOARD
- STD = POWER SUPPLY ASSEMBLY ONLY



PARTS LIST

PARTS LIST NO.	REVISION
010362	F

REVISION

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POWER SUPPLY ASSEMBLY

DISK 5/13/

DRAWN K. KNOBLOCK
DATE 9/8/88

Q	STD	1	2	3
1	1	1	1	1

PART
NUMBER

DESCRIPTION

FSCM NO.

PWA, GPIB WITH STD CONTROL PROM

1999

55744

55744

83330

63865

1

96906

96906

96906

03330

03330

2000

21/33

CCCTC

1

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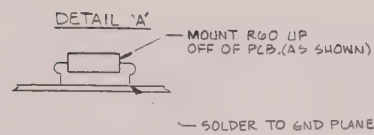
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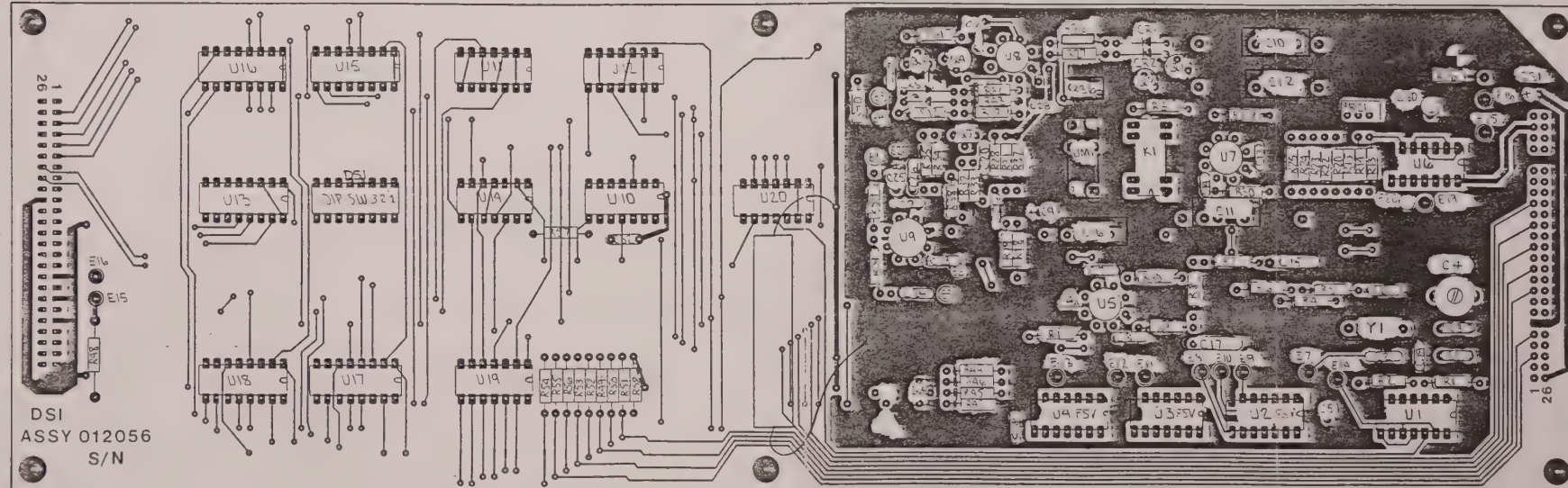
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19853 (11/90)



ITEM	DESCRIPTION	QTY
A	ECO D-2038 GH	1
B	ECO D-2038 GH	1
C	ECO D-2038 GH	1
D	ECO D-2038 GH	1
E	ECO D-2038 GH	1
F	ECO D-2038 GH	1
G	ECO D-2038 GH	1
H	ECO D-2038 GH	1
I	ECO D-2038 GH	1
J	ECO D-2038 GH	1
K	ECO D-2038 GH	1
L	ECO D-2038 GH	1
M	ECO D-2038 GH	1
N	ECO D-2038 GH	1
P	ECO D-2038 GH	1

1	2	3	4	5	6	7	8	9
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1	2	3	4	5	6	7	8	9
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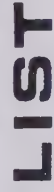
SEE DETAIL 'A'

1. SOLDER PLUG ALL FEED THROUGH HOLES NOT USED FOR MOUNTING COMPONENTS.

CONFIGURATION TABLE	
DASH NO.	DESCRIPTION
STD	STANDARD BD
-1	WITH 10 WATT RESISTOR ADDED

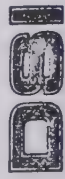
INSTALL TRANSISTOR PAD 7711-5N UNDER Q5.

DSI DESIGN NO. 55744 DATE 11/10/71 BY 11/10/71		DRAWN BY 11/10/71 CHECKED BY 11/10/71 APPROVED BY 11/10/71
NARROW BAND MODULATOR		
PART NO. 7712/7721 REV. 1	QTY 1 UNIT P	DATE 11/10/71 BY 11/10/71



4 OF

#019808-279



PARTS LIST

P/L NO.

012056

REV

P

TITLE

ASSEMBLY

NARROW BAND MOD

11/16/93

SHEET

2

DWN

FWC

DATE 1/15/77

ITEM NO.	QTY STD	QTY -1	PART NO.	DESCRIPTION	REF DESIGNATOR	VENDOR CODE
1	1	1	468232	CIRCUIT BOARD	013026	55744
2	1	1	506300	INTEGRATED CIRCUIT	74S00	01295
3	1	1	507004	✓	74LS04	✓
4	2	2	507037		74LS37	
5	1	1	507085		74LS85	
6	1	1	507174		74LS174	
7	1	1	507175		74LS175	
8	FSV	FSV	507196		74LS196	
9	2	2	504130		74157	
10	1	1	514047	✓	LH1458H	✓
11	3	3	514330	INTEGRATED CIRCUIT	LH0002CH	01295
12	1	1	520065	TRANSISTOR	2N2270	04713
13	1	1	520075	TRANSISTOR	2N2432A	✓
14	3	3	520100	TRANSISTOR	2N2945A	
15	1	1	520180	TRANSISTOR	2N3904	✓
16	4	4	522180	DIODE	1N4148	04713
17	2	2	524370	CAPACITOR	2.2uf CK06	15450
18	2	2	526060	✓	10pf DM-15	00853
19	4	4	530040		, TANT 35V 20% 6.8uf	56289
20	1	1	530080	✓	, TANT 35V 20% 47uf	56289
21	14	14	532360	CAPACITOR , CER NPO	.1uf	15450
23	1	1	534160	RESISTOR, RC07 5%	22 Ohm	91637



PARTS LIST

P/L NO.

012056

REV

P

TITLE ASSEMBLY

11/16/93

SHEET

3

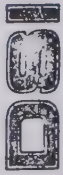
NARROW BAND MOD

DWN FWC

DATE 1/15/77

ITEM NO.	QTY	PART NO.	DESCRIPTION	REF DESIGNATOR	VENDOR CODE
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24	1	534120	RESISTOR, RC07 5% 15 ohm 1/4 W	R34 (6X)	91637
25	11	534240	✓ 47 ohm	R9-11, R3, R25, R29-32, R37-38	
26	2	534250	51 Ohm	R5 (8Y), R39 (5Y)	
27	1	534260	56 Ohm	R40 (5X)	
28	1	534290	75 Ohm	R15 (8X)	
29	1	534320	100 Ohm	R57 (4X)	
30	2	534390	200 Ohm	R4 (8Y), R17 (6X)	
31	1	536020	300 Ohm	R59 (6X)	
32	1	536070	470 Ohm	R28 (6W)	
33	4	536150	1K	R1(9Z), R2(8Z), R45(6Z)	
34	1	536170	1.2K	R35 (6X)	
35	2	536220	2K	R19 (6Y), R20 (8X)	
36	1	536260	3K	R18 (6Y)	
37	14	536320	5.1K	R26,27; R42-44, R49-56, R58	
38	1	538050	RESISTOR, RC07 5% 20K 1/4 W	R33 (6X)	
39	2	541152	RESISTOR, 1% FILM RN55C 301 Ohm	R14 (8X), R13 (8X)	
40	1	542205	RESISTOR, RC20 56 Ohm 1/2 W	R46 (6Z)	
41	3	542250	RESISTOR, RC20 100 Ohm 1/2W	R47(6Z), R48(1Z), R16(9W)	91637
42	1	543065	POTENTIOMETER 100 Ohm	R36 (7X)	80294
43	1	543100	POTENTIOMETER 2K Ohm	R21 (8Y)	80294
44	2	502010	INTEGRATED CIRCUIT 7400	U6(8/9X), U10(4X)	12040
45	1	548330	RELAY 831-A-2	K1 (7X)	94696
46	1	FSV	XTAL	Y1 (8Y)	13454
47	1	520276	MIXER SRA6	UM1 (7X)	15542



PARTS LIST

P/L NO.

012056

REV

P

TITLE

ASSEMBLY

NARROW BAND MOD

11/16/93

SHEET

4

DWN FWC

DATE 1/15/77

ITEM NO.	QTY	PART NO.	DESCRIPTION	REF DESIGNATOR	VENDOR CODE
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48	6	6	FSV	RESISTORS FSV	R6(8Y), R7, R22-R24(8X), R8(7X)	91637
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49	7	7	FSV	CAPACITORS FSV	C3(9Y), C15(8Y), C16(7Y), C17(7Z),	15450
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					C10, C12 (8W), C11 (7X)	
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50	1	1	507011	INTEGRATED CIRCUIT 74LS11	U20 (5X)	01295
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51	2	2	554444	HEADER, DOUBLE, 2 x 36	J15, J14	22526
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52	1	1	548070	DIPSWITCH	DS1	23880
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53	1	1	502080	INTEGRATED CIRCUIT	U14 (3X)	12040
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54	1	1	528100	CAPACITOR	C32 (4X)	00853
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55	1	1	532518	CAPACITOR, VARIABLE COND	C4(9Y)	73899
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56	1	1	536240	RESISTOR, RC07, 5%	R12 (6X)	01121
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57	-	1	542735	RESISTOR, WIREBOUND, AXIAL, 10 OHM	R60 (5Y)	12697
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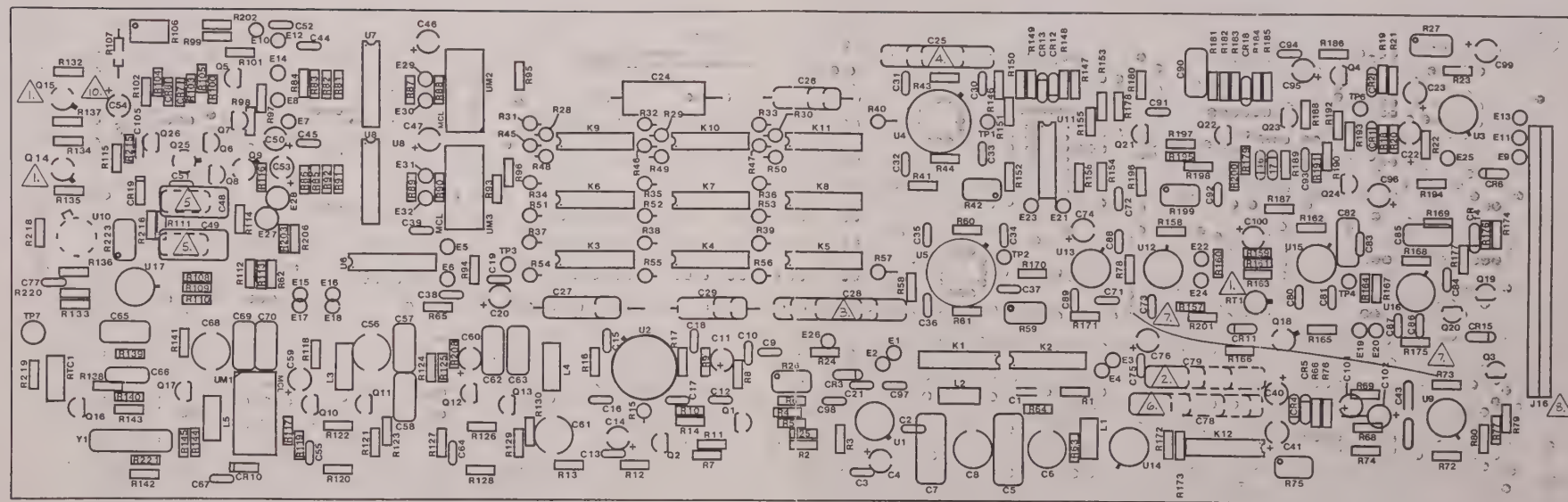
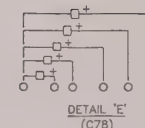
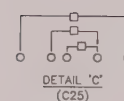
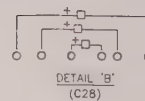
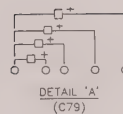
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T	ECO D-2690 GH	GH	6-19-89	1.1
U	ECO-3055	GH	10-16-90	1.1
V	ECO-3075	GH	1-11-91	1.1
W	ECO-4113-103	GH	9-22-92	1.1



11. REMOVED
 10. #30 AWG JUMPER C54 TO R107 (WHEN CLAD NOT PRESENT)
 9. FOR SCHEMATIC SEE NO. 015057.
 8. CLIP ALL LEADS FLUSH ON BOTTOM SIDE OF J16 AFTER INSTALLATION.
 7. INSTALL JUMPER NO. 28 WHT AWG.
 6. SEE DETAIL 'E' FOR C78 VARIABLES.
 5. SEE DETAIL 'D' FOR C48 & C49 VARIABLES.
 4. SEE DETAIL 'C' FOR C25 VARIABLES.
 3. SEE DETAIL 'B' FOR C28 VARIABLES.
 2. SEE DETAIL 'A' FOR C79 VARIABLES.
 1. INSTALL TRANSISTOR PAD (ITEM 179) Q14, Q15 & RT1.
- NOTES: UNLESS OTHERWISE SPECIFIED

E9	E10	RED	24	#26 BLK & WHT
E11	E12	WHT	26	TWISTED PAIR
E13	E14	BLK	26	W/#24 RED
E25	E26	WHT	24	
E23	E24	BLK	26	#26 BLK & WHT
E21	E22	WHT	26	TWISTED PAIR
E8	E20	SHIELD		RG174/U COAX
E7	E19	CENTER		
FROM	TO	COLOR	AWG	REMARKS
WIRE LIST				

DSI DECOM SYSTEMS INC. 340 RANCHEROS DR SAN MARCO, CALIF 93688 PHONE: 714-745-1111 FAX: 714-745-1112 WWW: WWW.DSI-INC.COM	
PROJECT: G. HAYES 6-19-89 DATE: 6-19-89	DRAWN: 7132 CHECKED: 7132 DATE: 6-19-89
DEMODULATOR BD. PART NO: 55744 REV: 2.1 QTY: 012057 W: L=J	



PARTS LIST

P/L NO.

012057

REV

W

TITLE

PSK DEMOD BOARD

SHEET
9

DW'N

FWC

DATE

9-21-77

VENDOR
CODE

REF DESIGNATOR

DESCRIPTION

PART NO.

ITEM
NO.

QTY
STD -1

FSV CAPACITORS

C5(4Z), C6(4Z), C7(4Z), C8(4Z), C24(6W),

C25(4W), C26(5W), C27(6Y), C28(5Y),

C29(5Y), C48(8X), C49(8X), C56(7Y),

C62(7Y), C58(7Y), C61(6Z), C57(7Y),

C63(7Y), C68(8Y), C69(8Y), C70(8Y),

C75(3Y), C76(3Y), C78(3Z), C79(3Z)

R133, R218, R220, R135, R221

RESISTOR, 750 ohm RN55C

FSV CHOKE

L1(3Z), L2(4Z), L3(8Y), L4(6Y), L5(8Z)

FSV MIXER

UM1(8Z), UM2(7W), UM3(7X)

FSV X-TAL

Y1(9Z)

P.C. BOARD

013027

HEADER, DOUBLE, 2 X 36 65610-4-72

TEST JACK 105-1852-001

TRANSISTOR PAD

7717-5N

FOR FSV INFORMATION SEE VC 012057 FOR

SPECIFIC DEMOD BD SERIAL #.



PARTS LIST

TITLE

PSK DEMOD BOARD

P/L NO.				REV W	
012057					
DWN				SHEET	
DATE				8	
9-21-77					
REF DESIGNATOR				VENDOR CODE	
145	1	541601	RESISTOR, TC 1% 500 OHM	RTC1(9Z)	01295
146	2	541394	RESISTOR, RN55C 1% 100K	R72(1Z), R73(1Z)	91637
147	4	541328	↕	R6(5Z), R68(2Z), R69(2Z), R136	↕
148	1	541356		R4(5Z)	↕
149	1	541369	RN55C 1% 54.9K	R169(1X)	91637
150	2	542270	½W 5% 150 ohm	R186(2W), R187(2X)	01121
151	2	543080	POT 500 ohm	R59(4Y), R42(4X)	73138
152	2	543090	POT 1K	R26(5Z), R106(9W)	↕
153	1	543100	POT 2K	R199(3X)	↕
154	2	543110	POT 5K	R27(1W), R223	73138
155	3	548330	RELAY 831A-2	K12(3Z), K1(4Y), K2(4Y)	94696
156	9	548340	RESISTOR, RELAY 832A-2	K3(6Y), K4(5Y), K5(5Y), K6(6X), K7(5X), K8(5X), K9(6X), K10(5X), K11(5X)	94696
158	1	543130	RESISTOR, POT 20K	R75(2Z)	
159			FSV RESISTORS	R1(3Z), R28(6X), R29(6X), R30(5X), R31(6W), R32(6X), R33(5X), R34(6X), R35(6X), R36(5X), R37(6X), R38(6X), R39(5Y), R45(6X), R46(6X), R47(5X), R48(6X), R49(6X), R50(5X), R51(6X), R52(6X), R53(5X), R54(6Y), R55(6Y), R56(5Y), R63(3Z), R64(3Z), R65(7Y), R66(2X), R163(2Y), R168(1Y), R201(3Y), R203(8X), R206(8X), R161(2Y), R159(2Y)	



PARTS LIST

TITLE

PSK DEMOD BOARD

P/L NO.

012057

REV
W

SHEET

7

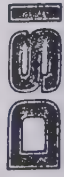
DWN FWC

DATE 9-21-77

VENDOR
CODE

91637

ITEM NO.		QTY	PART NO.	DESCRIPTION	REF DESIGNATOR	VENDOR CODE
121	1		541144	RESISTOR, RN55C 1% 249 ohm	R100(9W)	91637
122	2		541152	RESISTOR, RN55C 1% 301 ohm	R110(9Y), R62(8Y)	91637
123	1		541164	RESISTOR, RN55C 1% 402 ohm	R78(3Y)	91637
124	5		541170	RESISTOR, RN55C 1% 464 ohm	R108, R109(9Y), R112(8Y), R113(8Y), R197	91637
125	1		541248	RESISTOR, RN55C 1% 3.01K	R196(3X)	91637
126	2		541174	RESISTOR, RN55C 1% 511 ohm	R164(2Y), R25(5Z)	91637
127	* 2		541188	RESISTOR, RN55C 1% 715 ohm	R142(9Z), R145(8Z)	91637
128	1		541194	RESISTOR, RN55C 1% 825 ohm	R9(6Y)	91637
129	2		541196	RESISTOR, RN55C 1% 866 ohm	R115(9X), R116(8X)	91637
130	2		541198	RESISTOR, RN55C 1% 909 ohm	R114(8X), R111(9X)	91637
131	1		541231	RESISTOR, RN55C 1% 2K	R167(1Y)	91637
132	2		541204	RESISTOR, RN55C 1% 1.05K	R154(3X), R155(3W)	91637
133	2		541208	RESISTOR, RN55C 1% 1.15K	R147(3W), R150(4W)	91637
134	2		541212	RESISTOR, RN55C 1% 1.27K	R148(3W), R149(4W)	91637
135	3		541218	RESISTOR, RN55C 1% 1.47K	R158(3X), R160(3Y), R7(5Z)	91637
136	* 2		541220	RESISTOR, RN55C 1% 1.54K	R139(9Y), R140(9Z)	91637
137	2		541223	RESISTOR, RN55C 1% 1.65K	R171(3Y), R202(9W)	91637
138	1		541238	RESISTOR, RN55C 1% 2.37K	R157(3Y)	91637
139	1		541246	RESISTOR, RN55C 1% 2.87K	R156(3X)	91637
140	1		541316	RESISTOR, RN55C 1% 15.4K	R137(9W)	91637
141	3		541270	RESISTOR, RN55C 1% 5.11K	R101(9W), R74(2Z), R76(1Y)	91637
143	* 2		541272	RESISTOR, RN55C 1% 5.36K	R143(9Z), R144(8Z)	91637
144	2		541280	RESISTOR, RN55C 1% 6.49K	R104(9W), R105(9W)	91637



PARTS LIST

P/L NO.

012057

REV

W

TITLE

PSK DEMOD BOARD

DWN FWC
DATE 9-21-77

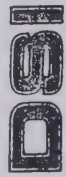
SHEET

6

REF DESIGNATOR

VENDOR
CODE

ITEM NO.	QTY STD	PART NO.	DESCRIPTION	REF DESIGNATOR	VENDOR CODE
98	1	536150	RESISTOR, RC07 5% 1K	R10(6Z)	01121
99	1	536190	RESISTOR, RC07 5% 1.5K	R191(2X)	
100	2	541222	RESISTOR, RN55 1% 1.62K	R182(2W), R180(3W)	
101	4	536210	RESISTOR, RC07 5% 1.8K	R119(8Z), R121(7Z), R127(7Z), R129(7Z),	
103	2	536220	2K	R172(3Z), R79(1Z)	01121
104	1	536230	2.2K	R98(8W)	
105	1	536260	RESISTOR, RC07 5% 3K	R173(3Z)	
106	2	541252	RESISTOR, RN55 1% 3.32K	R200(2X), R195(3X)	
107	5	536320	RESISTOR, RC07 5% 5.1K	R20(2X), R21(2W), R66(2Z), R77(1Z),	
109	1	536330	5.6K	R166(3Y)	
110	1	536390	10K	R24(5Y)	
111	*	536270	3.3K	R216(9X)	
112	1	538150	51K	R124(7Y)	
113	2	538250	RC07 5% 130K	R107(9W)	
114	1	540130	RC07 5% 2.2M	R22(1X), R23(1W)	01121
115	1	541227	RN55 1% 1.82K	R215(9X)	
116	1	541078	RN55C 1% 51.1 ohm	R198(3X)	
117	1	541108	105 ohm	R165(2Y)	91637
119	1	541136	RESISTOR, RN55C 1% 205 ohm	R138(9Z)	
120	2	541106	RESISTOR, RN55C 1% 100ohm	R170(4Y)	91637
				R41(4X), R58(4Y)	91637



PARTS LIST

P/L NO.

012057

REV
W

TITLE

PSK DEMOD BOARD

DWN FWC
DATE 9-21-77SHEET
5VENDOR
CODE

REF DESIGNATOR

DESCRIPTION

PART NO.

ITEM
NO.QTY
STD -1

RESISTOR, RC07 56 ohm

R176(1X), R177(1Y), R189(2X),
R192(2X), R193(2X) 01121

82 ohm

R89(7X), R87(7W), R92(8X), R82(8W)

100 ohm

R95(7W), R96(7X), R132(9W)

130 ohm

R90(7X), R91(8X), R88(7W), R81(8W)

160 ohm

R83(8W), R85(8X)

180 ohm

R16(6Y), R17(6Y), R43(4W), R44(4X),
R60(4X), R61(4Y), R208(7Y)

*

3

R118(8Y), R120(8Z), R128(7Z)

200 ohm

R14(6Z), R99(9W), R174(1X), R175(1Y),
R3(5Z)

240 ohm

R181(2W)

270 ohm

R84(8W), R86(8X)

330 ohm

R13(6Z), R194(1X)

360 ohm

R184(2W)

390 ohm

R141(8Y)

470 ohm

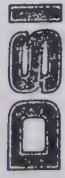
RESISTOR,

R18(2X), R19(2W), R152(4X), R153(3W) 01121

249 ohm

RESISTOR

R219



PARTS LIST

P/L NO.

012057

REV

W

TITLE

PCK DEMOD BOARD

SHEET

3

DWN

FWC

DATE

9-21-77

VENDOR

CODE

REF DESIGNATOR

DESCRIPTION

PART NO.

ITEM
NO.QTY
STD -1

26

14

522180

DIODE

1N4148

CR1(2W), CR2(2X), CR3(5Y), CR6(1X),

04713

CR7(9W), CR11(2Y), CR12(4X), CR13(4W),

CR14(1X), CR15(1Y), CR16(2X), CR17(2X),

30

1

514458

INTEGRATED CIRCUIT

REF-01-EJ

U17

06665

31

3

524360

CAPACITOR, CK05

1 μ f

C1(4Z), C42, 43(1Z)

00656

32

3

526015

DM-15

3pf

C82(2X), C85(1X), C90(3W)

84171

33

2

526080

DM-15

15pf

C65(9Y), C66(9Y)

84171

34

11

530040

TANT

6.8 μ f

C11(5Y), C14(6Z), C20(7Y),

31433

, C46(7W), C47(7X), C50(8X),

C53(8X), C74(3X), C95(2W), C96(2X),

C100(2X)

38

1

524010

CK05

.001

C105(9X)

39

3

530060

TANT

15 μ f

C54(9W), C40(2Z), C41(2Z)

31433

40

3

530070

TANT

22 μ f

C22(1X), C23(1W), C99(1W)

31433

41

1

530080

TANT

47 μ f

C4(4Z)

31433

42

44

532360

CAPACITOR, CERAMIC

.1 μ f

C2(4Z), C3(4Z), C9(5Y), C10(5Y),

15450

019808-279



PARTS LIST

TITLE

PSK DEMOD BOARD

P/L NO.

012057

REV

W

SHEET

2

DWN

FWC

DATE

9-21-77

ITEM NO.	QTY STD	QTY -1	PART NO.	DESCRIPTION	REF DESIGNATOR	VENDOR CODE
1	3		514012	INTEGRATED CIRCUIT	LM318H	U13(3Y), U15(2Y), U16(1Y) 12040
2	1		514045		LM741CH	U14(3Z) 12040
3	3		514047		LM1458H	U3(1W), U9(1Z), U10(9X) 12040
4	1		514202		MC1590G	U1(5Z) 04713
5	1		514204		MC1596G	U12(3Y) 04713
6	2		514206		MC1670L	U7(7W), U8(7X) 04713
7	1		514208		MC1692L	U6(7Y) 04713
8	3		514385		LH0033GG	U2(6Z), U4(4W), U5(4Y) 12040
9	2		520070		2N2369	Q8(8X), Q9(8X) 04713
10	1		520065		2N2270	Q14(9X) 1
11	1		520100		2N2945A	Q18(2Y/Z) 1
12	9		520180		2N3904	Q1(5Z), Q2(6Z), Q3(1Z), Q4(2W), Q5(8W), Q19(1Y), Q21(3X), Q22(2W), Q26(9X) Q10(8Z), Q11(7Z), Q12(7Z), Q13(7Z), Q16(9Z), Q17(8Z) Q6(8X), Q7(8X), Q20(1Y), Q23(2W), Q24(2X) 04713
16	5		520190		2N3906	Q15(9W) 12040
18	1		520195	INTEGRATED CIRCUIT	2N4037	Q25(8X) 02735
19	1		520265		SD215DE	U11(3X) 18178
20	1		520255		CA3046	RT1(2Y) 04713
21	1		520400	VACTEK	VTL-2C4	CR10(8Z) 04713
22	*	1	522085	IN 757		CR18(2W) 98220
23	1		522080	IN 756A		
24	2		522290	DIODE	5082-2835	

A

11

1

[illegible]

1

1

5

1

1

FSCM
55744

PARTS LIST

FSCM 55744  PARTS LIST PARTS LIST NO. 012060 REVISION J										TITLE ASSEMBLY WIDE BAND MODULATOR										DISK 10/18/90		DRAWN FWC DATE 4/12/83		SHEET 2	
ITEM NO.	STD	x3xx	x2xx	xx1x	xxx2	xxx1	PART NUMBER	DESCRIPTION	REFERENCE DESIGNATOR	FSCM NO.															
1	1						468430	PWB-WIDE BAND MOD 013025		55744															
2	1						502050	INTEGRATED CKT 7404	U7(9D)	01295															
3	2						502200	INTEGRATED CKT 7437	U12(8D); U13(8D)	01295															
4	*	1	1				506300	INTEGRATED CKT 74S00	U1(8F)	01295															
6				1			507000	INTEGRATED CKT 74LS00	U6(9D)	01295															
7				1			507085	INTEGRATED CKT 74LS85	U5(10D)	01295															
8				1			507174	INTEGRATED CKT 74LS174	U9(9F)	01295															
9				1			507175	INTEGRATED CKT 74LS175	U8(10F)	01295															
11				2			504130	INTEGRATED CKT 74157	U10(10E); U11(9E)	01295															
12	*	1	1				514045	INTEGRATED CKT LM741CH	U2(8E)	01295															
13	*	1	1				514330	INTEGRATED CKT LH0002C	U4(6E)	01295															
14					1		514700	INTEGRATED CKT WJ-A7	U3(5D)	01295															
16				1			520065	TRANSISTOR 2N2270	Q15(10D)	04713															
17	***	3	3				520100	TRANSISTOR 2N2945A	Q12(8F); Q13(8F); Q14(7F)	01295															
18						1	520180	TRANSISTOR 2N3904	Q6(2E)	01295															
19	*	1	1				520190	TRANSISTOR 2N3906	Q10(7D)	04713															
21	****	4	4				520225	TRANSISTOR 2N5179	Q7(8D) Q8(7D) Q9(7E) Q11(5D)	02735															
	**					4		TRANSISTOR	Q2(3E); Q3(2E); Q4,5(3D)																
23						1	520267	TRANSISTOR FET-SD306	Q1(4E)	18324															
24	**	1	1				520270	MIXER SRA-1	M2(6D)																



FSCM
55744

PARTS LIST

TITLE										DISK		PARTS LIST NO.		REVISION
ASSEMBLY										10/18/90		012060		J
WIDE BAND MODULATOR												DRAWN FWC		SHEET
ITEM NO.	STD	x3xx	x2xx	xx1x	xxx2	xxx1	PART NUMBER	DESCRIPTION	REFERENCE DESIGNATOR	FSCM NO.	DATE 4/12/83			
25						1	520270	MIXER	SRA-1	M1(2E)				15542
26	1					1	522070	DIODE	IN752	CR1(2D)				15542
27		6	6				522180	DIODE	1N4148	CR3,C44(6D); CR5(9F)				01295
29		1	1				524010	CAPACITOR, .001 μ F CK05		CR6,CR7(8F); CR8(7F)				
31		2	2				526080	CAPACITOR, DM15	15pf	C35(7D)				37942
33				1		2	528100	CAPACITOR, DM15	1000pf					
34		1	1				F S V	CAPACITOR, DM15		C27, C28(8D)				84171
						1				C19(3E); C20(3D)				
										C55(10D)				84171
										C31(7D)				
										C2(4E)				
37		1	1				F S V	CAPACITOR, DM15						
						1				C32(7E)				
39		1	1				F S V	CAPACITOR, DM15		C10(4E)				
						1				C37(6E)				
										C11(3E)				
42		1	1				F S V	CAPACITOR, DM15						
						1				C38(6D)				
44							F S V	CAPACITOR, DM15		C24(2D)				
						1				C25(2D)				
46		1	1				F S V	CAP TANT, DM15						
47		1	1				F S V	CAP TANT, DM15		C52(7E)				
48		1	1				F S V	CAP TANT, DM15		C53(7E)				
										C54(7F)				

FSCM
55744

PARTS LIST

PARTS LIST										PARTS LIST NO. 012060		REVISION J	
TITLE ASSEMBLY WIDE BAND MODULATOR										DISK 10/18/90		DRAWN FWC DATE 4/12/83	SHEET 4
ITEM NO.	STD	x3xx	x2xx	xx1x	xxx2	xxx1	PART NUMBER	DESCRIPTION	REFERENCE DESIGNATOR	FSCM NO.			
49						1	F S V	CAPACITOR, VARIABLE	C23(2E)				
51		1	1				F S V	CAPACITOR, VARIABLE	C30(7D)				
52						1	F S V	CAPACITOR, VARIABLE	C1(4F)				
53		1	1				F S V	CAPACITOR, VARIABLE	C36(6E)				
54						1	F S V	CAPACITOR, VARIABLE	C9(4E)				
56	2						530040	CAPACITOR, TANT 6.8 μ F	C41(3F); C43(5F)	37942			
		3	3						C49(8F); C50(6E); C51(6F)				
59	1					1			C6(4E)				
							530080	CAPACITOR, TANT 47 μ F	C42(6F)	37942			
61		10	10				532360	CAPACITOR, CER .1 μ F	C45(6D); C34, 56(7E); C33(8E)	51406			
									C39, 44, 46, 47, 57(5D);				
									C40(5E); C29(8D)				
						14	532360	CAPACITOR, CER	C3, C4, C7, C8(4E); C5(4F)	51406			
									C22(3D); C13, 15(2E) C18				
									C26(2D); C12, 14, 16, 17(3E)				
					1		532360	CAPACITOR, CER	C48(5D)	51406			
68		1	1				F S V	CAPACITOR, VAR	C29(8D)				
						1			C21(3D)				
70		2	2				533037	INDUCTOR, 100 μ H	L8(8E); L10(5D)	72259			
						1	533037	INDUCTOR, 100 μ H	L7(4E)				
						3	533037	INDUCTOR, 100 μ H	L9(5D); L8(8E); L10(5D)				

FSCM
55744

PARTS LIST

PARTS LIST NO.
012060REVISION
J

TITLE

ASSEMBLY

WIDE BAND MODULATOR

DISK

10/18/90

DRAWN FWC

DATE 4/12/83

SHEET

5

ITEM NO.	QUANTITY					PART NUMBER	DESCRIPTION	REFERENCE DESIGNATOR	FSCM NO.
	STD	x3xx	x2xx	xx1x	xxx2	xxx1			
73						1	INDUCTOR	L1(4E)	
		1	1					L4(7D)	
76						1	INDUCTOR	L2(4E)	
		1	1					L5(6E)	
78						1	INDUCTOR	L3(2D)	
79		1	1			534050	RESISTOR, RC07	R58(5D)	01121
81		2	2			534080	RESISTOR, RC07	R52, R73(6E)	01121
						4		R1(5F);R19,94(3E);R30(2E)	
83		1	1			534120	RESISTOR, RC07	R43(7D)	01121
84						1	RESISTOR, RC07	R18(2F)	01121
86		2	2			534180	RESISTOR, RC07	R50, R51(5E)	01121
87						1	RESISTOR, RC07	R2(5F)	01121
88		3	3			534240	RESISTOR, RC07	R74,76(6E); R75(6F)	01121
89		1	1			534250	RESISTOR, RC07	R61(5D)	01121
						1		R62(4D)	
92		1	1			534290	RESISTOR, RC07	R67(7E)	01121
93		2	2			534320	RESISTOR, RC07	R33(8D); R55(5D)	01121
				1				R85(9D)	
						1	RESISTOR, RC07	R14(3E)	01121

FSCM 55744		PARTS LIST										PARTS LIST NO. 012060		REVISION J					
TITLE ASSEMBLY WIDE BAND MODULATOR														DISK 10/18/90		DRAWN FWC DATE 4/12/83		SHEET 6	
ITEM NO.	STD	QUANTITY					PART NUMBER	DESCRIPTION	REFERENCE DESIGNATOR	FSCM NO.									
		x3xx	x2xx	xx1x	xxx2	xxx1													
97		1	1				534360	RESISTOR, RC07 150 Ω	R53(5D)	01121									
98						1	536020	RESISTOR, RC07 300 Ω	R95(4E)	01121									
99						1	536030	RESISTOR, RC07 330 Ω	R17(3F)	01121									
101		1	1				536050	RESISTOR, RC07 390 Ω	R59(5D)	01121									
						1			R27(3E)										
103		2	2				536080	RESISTOR, RC07 510 Ω	R46(7D); R60(5D)	01121									
104		5	5				536150	RESISTOR, RC07 1K	R40,48,49(7D)R45(7E)R96(8E)	01121									
				1					R90(10D)										
						1			R28(2D)										
108		2	2				536220	RESISTOR, RC07 2K	R41(7D); R68(8E)	01121									
						1			R29(2D)										
111						1	536290	RESISTOR, RC07 3.9K	R6(4E)	01121									
112		4	4				536320	RESISTOR, RC07 5.1K	R56,R57(6D); R71,R72(7F)	01121									
						1				R9(4F)									
114		2	2				536390	RESISTOR, RC07 10K	R42(7D); R70(9E)	01121									
						1				R7(4F)									
116						1	536410	RESISTOR, RC07 12K	R5(4E)	01121									
117	9	1	1				538050	RESISTOR, RC07 20K	R77-79,83(9F); R86-89(9C)	01121									
									R93(10D)R66(8F)*MAX QTY 10										
119		1	1				538120	RESISTOR, RC07 39K	R47(7D)	01121									
120						1	538220	RESISTOR, RC07 100K	R4(4E)	01121									

010032 (5/90)

FSCM
55744

PARTS LIST

TITLE

ASSEMBLY

WIDE BAND MODULATOR

DISK

10/18/90

DRAWN

FWC

DATE 4/12/83

SHEET

7

PARTS LIST NO.
012060REVISION
J

ITEM NO.	STD	x3xx	x2xx	xx1x	xxx2	xxx1	PART NUMBER	DESCRIPTION	REFERENCE DESIGNATOR	FSCM NO.
121						1	541108	RESISTOR, RN55 105 Ω	R20(3E)	91637
122		2	2				541152	RESISTOR, RN55 301 Ω	R64(8F); R65(8E)	91637
123						1	541174	RESISTOR, RN55 511 Ω	R16(3E)	91637
124		2	2				541184	RESISTOR, RN55 649 Ω	R36(8D); R39(7D)	91637
126						2	541188	RESISTOR, RN55 715 Ω	R23,R26(3D)	91637
127						1	541194	RESISTOR, RN55 825 Ω	R15(3E)	91637
128		2	2				541218	RESISTOR, RN55 1.47K	R34,R35(8D)	91637
						1			R13(3E)	
131						2	541220	RESISTOR, RN55 1.54K	R21(3E); R22(3D)	91637
132		2	2				541268	RESISTOR, RN55 4.87K	R37(8D); R38(7D)	91637
133						2	541272	RESISTOR, RN55 5.36K	R24,R25(3D)	91637
134						1	541328	RESISTOR, RN55 20.5K	R12(3E)	91637
135						1	541356	RESISTOR, RN55 40.2K	R10(3E)	91637
137				1			542205	RESISTOR, RG20 56 Ω	R91(10D)	01121
138		1	1				542250	RESISTOR, RG20 100 Ω	R63(6F)	01121
				2					R84,R92(10D)	
140						1	542270	RESISTOR, RG20 150 Ω	R32(2D)	01121
141		1	1				F S V	RESISTOR	R80(7E)	
						1			R3(5F)	
143		1	1				F S V	RESISTOR	R81(7E)	
						1			R11(3E)	



PARTS LIST

PARTS LIST NO.
012060

REVISION

TITLE

ASSEMBLY

WIDE BAND MODULATOR

DISK
10/18

8
SHEET

DRAWN FWC

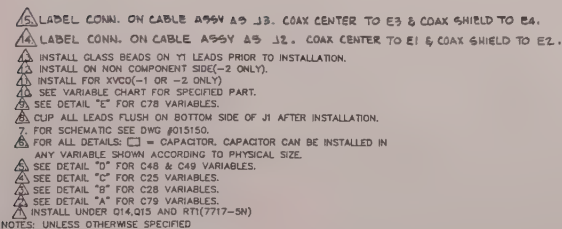
DATE 4/12/83

[illegible]

019982 (8/100)

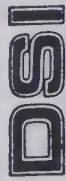
Figure 1 consists of five schematic diagrams, each representing a different wiring configuration for a five-terminal device. The terminals are represented by circles, and the internal components are represented by rectangles and lines. The diagrams are labeled DETAIL "A", DETAIL "B", DETAIL "C", DETAIL "D", and DETAIL "E".

- DETAIL "A"**: Shows a configuration where the first two terminals are connected to a common point, which is then connected to a resistor network leading to the other three terminals.
- DETAIL "B"**: Shows a configuration where the first terminal is connected to a resistor network that branches out to the other four terminals.
- DETAIL "C"**: Shows a configuration where the first two terminals are connected to a common point, which is then connected to a resistor network leading to the other three terminals.
- DETAIL "D"**: Shows a configuration where the first two terminals are connected to a common point, which is then connected to a resistor network leading to the other three terminals.
- DETAIL "E"**: Shows a configuration where the first two terminals are connected to a common point, which is then connected to a resistor network leading to the other three terminals.



SEE SEPARATE LISTS (P/L)

[illegible]



PARTS LIST

PL NO.

012182

REV.

R

TITLE

NARROW BAND PSK DEMODULATOR

APP. BY

DATE

NEXT PL.

DATE

LTR

REVISIONS

NEXT ASSY.

NEXT PL.

MODEL NO.

DATE

SHEET

OF 9

PRELIMINARY RELEASE

RJC

2-24-81

PRODUCTION RELEASE

FWC

8-11-81

ECO D-0890

FWC

9/29/82

ECO D-0936

FWC

12-7-82

ECO D-1145

GLG

3/17/83

ECO D-1212

GLG

5/10/83

ECO D-1358

GLG

11/1/83

ECO D-1446

KWT

3/13/84

ECO D-1502

GH

2/8/85

ECO D-1689

GH

9/13/85

INCorp ECO D-1847

GH

6/13/86

INCorp ECO D-2203

GH

4/27/87

INCorp ECO D-2705

GH

9/28/88

INCorp ECO D-2773, D-2782

JCT

12/20/88

INCorp ECO D-2697

JCT

12/27/88

INCorp ECO D-3062

GH

10/5/89

INCorp ECO D-3055

GH

10/18/90

ADD -X1 CONFIGURATION, W/O #1358

FWC

11/28/90

REFERENCE DRAWINGS

DWG NO.

TITLE

015150

SCHEMATIC DWG.

-X1 DISCONNECTABLE INPUTS, 50 MV TO 500 MV
INPUT (ADD TO STD, -1 OR -3)

-3 10 K OHM INPUT IMPEDANCE

-2 REFER TO -1 COLUMN FOR PART USAGE

-1 WITH XVCO

STD STANDARD

DASH # DESCRIPTION

DSI

PARTS LIST

P/L NO.

012182

REV

R

TITLE

NARROW BAND PSK DEMODULATOR

DWN

B. Carver

SHEET

2

DATE 2-5-81

ITEM NO.	QTY			PART NUMBER	DESCRIPTION	REF DESIGNATOR	VENDOR CODE
	STD	-1	-3	-X1			
1	2	2	2	-	INTERGRATED CIRCUIT	74S74	U7=E9, U8=E8
2	2	1	-	-	"	74LS190	U6=E9
3	2	2	2	-	AMP	LM318H	U13=D4, U15=D3
4	2	2	2	-	"	UA741CV	U14=C4, U16=D2
5	1	1	1	-	INTEGRATED CIRCUIT	REF-01-EJ	U18
6	1	1	1	-	AMP	NE527HK	U17=D8
7	3	3	3	-	"	MC1458P	U3=E2, U9=D2, U10=E10
8	1	1	1	-	"	MC1590G	U1=C6
9	1	1	1	-	"	MC1596G	U12=D4
11	1	1	1	-	AMP	LH0002CH	U2=D7
12	2	2	2	-	"	LH0033CG	U4=E5, U5=D5
13	1	1	1	-	TRANSISTOR	2N2270	Q14=E10
14	2	2	2	-	"	2N2369	Q8=E10, Q9=E9
16	1	1	1	-	"	2N2945A	Q18=D3
17	13	13	13	-	"	2N3904	Q1=C6, Q3=D2, Q4=F3, Q5=F9, Q10=D9
20	5	5	5	-	"	2N3906	Q11=D9, Q12=D8, Q13=D8, Q16=D10
22	1	1	1	-	"	2N4037	Q17=D10, Q19=D2, Q21=E4, Q22=E3
24	1	1	1	-	TRANSISTOR	CA3046	Q6=E10, Q20=D2, Q23=E3, Q24=E3
							Q7=E10
							Q15=E10
							U11=E4



PARTS LIST

P/L NO.

012182

REV

R

TITLE

NARROW BAND PSK DEMODULATOR

DWN

B. Carver

SHEET

3

DATE

2-5-81

VENDOR

CODE

ITEM NO.	QTY			PART NUMBER	DESCRIPTION	REF DESIGNATOR	VENDOR CODE
	STD	-1	-3				
25	1	1	1	520276	SRA-6 MIXER	UM1=D9 (UM1, UM2, UM3)	
26	2	2	2	FSV	MCL-SRA-3H or SRA-6 MIXER	UM2=F8, UM3=E8	
27	1	1	1	520400	PHOTO TRANS	RT1=D3	
28	2	2	2	522060	DIODE	CR10=E9, CR19=D8	
29	1	1	1	522080	DIODE	CR18=F3	
31	13	13	13	522180	"	CR1=E2, CR2=F2, CR3=D6, CR6=E2,	
						CR7=E10, CR8=E10, CR11=D3, CR12=F4,	
						CR13=F4, CR14=E2, CR15=D2, CR16=E3,	
						CR17=E3	
35	2	2	2	522290	DIODE	CR4=D3, CR5=D3	
36	3	3	3	524360	CAPACITOR 1 uf	C42=C2, C43=D2, C1=D5	
37	2	2	2	526015	" 3 PF	C82=E3, C90=F4	
38	2	2	2	526270	" 100 PF	C65=D10, C66=D10	
39	11	11	11	530040	" 6.8 uf TANT	C11=D6, C50=E9, C53=E9, C59=D9,	
						C20=D8, C60=D8, C74=E4, C95=F3,	
						C96=E2, C100=E3	
						C103=F8	
43	3	3	3	530060	" 15 uf TANT	C40=D3, C41=C3, C54=E10	
44	3	3	3	530070	" 22 uf "	C22=E2, C23=F5, C99=F2	
45	1	1	1	530080	" 47 uf "	C4=C5	
46	43	43	43	532360	" .1 uf CERAMIC	C2=C5, C3=C6, C13=D9, C12=E8, C10=E8,	
						C9=D6, C15=D7, C16=D7, C17=D7,	
						C17=D7, C18=D7, C19=D8, C21=D6,	



PARTS LIST

DSI				PARTS LIST				P/L NO. 012182		REV R
TITLE NARROW BAND PSK DEMODULATOR								DWN B. CARVER DATE 2-5-81		SHEET 4
ITEM NO.	QTY		PART NUMBER	DESCRIPTION	REF DESIGNATOR	VENDOR CODE				
					C30=F5; C31=F5; C32=E5; C33=E5;					
					C34=E5; C35=E5; C36=D5; C37=D5;					
					C45=E8; C51=E10; C52=F9; C55=C9;					
					C64=C8; C67=C9; C71=D4; C72=E4;					
					C73=D4; C77=D11; C80=D3; C81=D3;					
					C83=E3; C84=D2; C87=D2; C88=E4;					
					C89=D4; C91=E4; C92=E3; C93=E3;					
					C94=F3; C97=D5; C98=D6					
57	23	23	FSV	CAPACITOR	C5=C5; C6=C4; C7=C5; C8=C5; C24=E7;					
					C25=F5; C26=F6; C27=D7; C28=D6;					
					C29=D7; C48=E10; C49=E10; C56=D9;					
					C57=D8; C58=D8; C61=C8; C62=D8;					
					C63=D8; C68=D10; C69=D9; C70=D9;					
					C78=D4; C79=D4					
64	5	5	FSV	INDUCTOR, VARIABLE	L1=C4; L2=D5; L3=D9; L4=D7; L5=C10					
65	1	1	534080	RESISTOR 10 5%	R134=E10					
66	3	3	534120	" 15 "	R97=E9; R102=E10; R103=E10					
67	2	2	534180	" 27 "	R1=D4; R64=D5					
68	-	-	534280	RESISTOR 68 5%	R1					
69	19	19	534240	" 47 "	R2=C6; R5=D6; R15=D7; R40=E6;					
					R57=D6; R93=E8; R94=D8; R123=C9;					
					R125=D8; R130=C8; R146=F5; R151=E5;					
					R178=E4; R179=E3; R183=F3; R185=F3;					



PARTS LIST

TITLE

NARROW BAND PSK DEMODULATOR

DSI					PARTS LIST					P/L NO. 012182		REV R	
TITLE												SHEET 5	VENDOR CODE
NARROW BAND PSK DEMODULATOR												DWN B. CARVER	
												DATE 2-5-81	
ITEM NO.	STD	QTY	-1	-3	-X1	PART NUMBER	DESCRIPTION	REF DESIGNATOR					
74	1	1	1	1	-	534250	RESISTOR 51 5%	RC07	R188=E3; R190=E3; R117=C9;				
75	5	5	5	5	-	534260	" 56 "	"	R80=C2				
									R176=E2; R177=E2; R189=E3; R193=E3;				
									R192=E3				
77	1	1	1	-	-1	534290	" 75 "	"	R63=C4				
78	5	5	5	-	-	534320	" 100 5%	"	R8=D6; R211=D9; R132=F10; R95=F8; R96=E8				
	-	-	6	-	-	534320	" 100 5%	"	R8, R67, R95, R96, R132, R211				
80	10	10	10	10	-	534380	" 180 "	"	R16=D7; R17=D7; R43=F5; R44=E5;				
									R60=E5; R61=D5; R118=D9; R128=C8;				
									R208=D8; R120=C9				
83	3	3	3	3	-	534390	" 200 "	"	R99=F10; R174=E2; R175=D2				
84	1	1	1	1	-	534410	" 240 "	"	R181=F3				
85	-	-	-	-	1	534070	" 8.2 "	"	R64				
86	1	1	1	1	-	536030	" 330 "	"	R194=E2				
87	1	1	1	1	-	536040	" 360 "	"	R184=F3				
88	4	4	4	4	-	536070	" 470 "	"	R18=E2; R19=F2; R152=E5; R153=E4				
89	1	1	1	1	-	536080	" 510 "	"	R3=C6				
90	1	1	1	1	-	534250	" 51 "	"	R210=C9				
91	-	-	-	-	1	534310	" 91 "	"	R63				
92	1	1	1	1	-	536150	" 1.0 K "	"	R76=D3				
93	1	1	1	1	-	536190	" 1.5 K "	"	R191=E3				
94	4	4	4	4	-	536210	" 1.8 K "	"	R119=C9; R121=C9; R127=C8; R129=C8;				
95	2	2	2	2	-	536220	" 2 K "	"	R172=C4; R79=D2;				
96	1	1	1	1	-	536260	RESISTOR 3.0 K 5%	RC07	R173=C4				



PARTS LIST

TITLE				P/L NO. 012182				REV R
NARROW BAND PSK DEMODULATOR				DWN B. CARVER				SHEET
				DATE 2-5-81				6
				REF DESIGNATOR				VENDOR CODE
ITEM NO.	STD	QTY	PART NUMBER	DESCRIPTION				
97	2	2	536270	RESISTOR 3.3 K 5%	R212=D9; R124=D8			
98	6	6	536320	" 5.1 K "	R20=E2; R21=F2; R66=D3; R77=D2;			
					R213=E8, R166=D3			
100	1	1	536330	" 5.6 K "	R24=D6			
101	1	1	538150	" 51 K "	R107=F10			
102	2	2	538250	" 130 K "	R22=E2; R23=F2			
103	1	1	541108	" 105 1%	R201=D4			
104	1	1	541136	" 205 "	R170=D5			
105	1	1	541078	" 51.1 "	R165=D3			
106	2	2	541144	" 249 "	R100=F10, R14			
107	2	2	541152	" 301 "	R110=D10; R62=D9;			
108	4	4	541156	" 332 "	R90=E8; R91=E8; R81=F8; R88=F8			
109	4	4	541170	" 464 "	R108=D10; R109=D10; R112=D9; R113=D9			
110	2	2	541106	" 100 "	R41=E5, R58=D5			
111	4	4	5441174	" 511 "	R25=C6; R74=C3; R138=D10; R164=D3			
113	1	1	541193	" 806 "	R78=D4			
114	2	2	541196	" 866 "	R115=E10; R116=E9			
115	2	2	541198	" 909 "	R111=E10; R114=E9			
116	4	4	541098	" 82.5 "	R82=F9, R92=E8, R89=E8, R87=F8			
117	1	1	541200	" 953 "	R197=E4			
118	-	1	541131	" 182 "	R63			
119	2	2	541204	" 1.05 K 1%	R154=E4; R155=E4			
120	3	3	541208	" 1.15 K 1%	R9=D7; R147=F4; R150=F5			



PARTS LIST

P/L NO.

012182

REV

R

TITLE

NARROW BAND PSK DEMODULATOR

SHEET

7

DWN B. CARVER

DATE 2-5-81

REF DESIGNATOR

VENDOR CODE

ITEM NO.	QTY		PART NUMBER	DESCRIPTION	REF DESIGNATOR	VENDOR CODE
	STD	-1				
121	2	2	-	RESISTOR 1.27 K 1%	RN55C	R148=E4; R149=F5
122	1	1	-	" 1.47 K "	"	R7=C7
123	2	2	-	" 1.65 K "	"	R202=F10; R171=D4
124	1	1	-	" 2 K "	"	R167=D2
125	5	5	-	" 750 OHM	"	R11,R12,R13,R65,R135
126	1	1	-	" 2.26 K 1%	"	R98=E9
127	1	1	-	" 2.87 K "	"	R156=E4
128	2	2	-	" 2.94 K	"	R158=E4; R160=E3
129	2	2	-	" 3.16 K 1%	RN55C	R182=F3; R180=F4
130	-	1	-1	" 9.76 K 1%	"	R1
131	2	2	-	" 3.65 K 1%	"	R145=C10; R142=C10
132	1	1	-	" 4.02 K 1%	"	R198=E4
133	1	1	-	" 15.4 K	"	R137=E10
134	2	2	-	" 5.11 K "	"	R101=F9; R141=D10
135	-	1	-1	" 226 "	"	R64
136	1	1	-	" 5.23 K "	"	R157=D4
137	1	1	-	" 6.19 K "	"	R196=E4
138	2	2	-	" 6.49 K "	"	R104=F10; R105=F10
139	2	2	-	" 6.81 K "	"	R195=E4; R200=E3
140	2	2	-	" 7.50 K "	"	R139(D10), R140 (D10)
141	4	4	-	" 20.5 K "	"	R6=D6; R68=C3; R69=D3; R136=D10
142	2	2	-	" 27.4 K "	"	R143=D10; R144=C10
143	2	2	-	" 29.4 K "	"	R161=E3; R159=E3
144	1	1	-	RESISTOR 40.2 K 1%	RN55C	R4=D6



PARTS LIST

TITLE				P/L NO.		REV
NARROW BAND PSK DEMODULATOR				012182		R
				DWN	B. CARVER	SHEET
				DATE	2-5-81	8
ITEM NO.	STD	QTY	PART NUMBER	DESCRIPTION	REF DESIGNATOR	VENDOR CODE
145	1	1 1	541364	RESISTOR 48.7 K 1%	RN55C	R169=E2
148	2	2 2	541394	" 100 k "	"	R72=C2; R73=D2
149	1	1 1	541601	RESISTOR TM - 1/8 - 501J OHM TEMP.	RTC1=D10	R187=E3; R186=F3
150	2	2 2	542270	RESISTOR 150 5% 1/2 W	RC07	R42=E5; R59=D5
151	2	2 2	543080	RESISTOR 500 POT	68 WR	R26=D6; R75=C3; R106=F10
152	3	3 3	543090	RESISTOR 1. K OHM POT	68 WR	
154	3	3 3	543110	RESISTOR 5 K OHM POT	68 WR	R27=F2; R199=D4; R10
155	29	29 29	FSV	RESISTORS	FSV	R28=E8; R29=E7; R30=E6; R31=E8;
						R32=E7; R33=E6; R34=E8; R35=E7;
						R36=E6; R37=E8; R38=E7; R39=E6;
						R45=E8; R46=E7; R47=E6; R48=E8;
						R49=E7; R50=E6; R51=E8; R52=E7;
						R53=E6; R54=D8; R55=D7; R56=E6;
						R122=C9; R126=D8; R162=D9; R163=D3;
						R168=D2
163	3	3 3	548330	RELAYS	K1=D5; K2=D5; K12=C3	
164	9	9 9	548340	RELAYS	K3=E7; K4=E7; K5=E6; K6=E7; K7=E7	
					K8=E6; K9=E7; K10=E7; K11=E6	
166	-	1 -	FSV	CRYSTAL	Y1=C10	
167	7	7 7	556300	TEST JACK (RED)	TP1-TP7	
168	1	1 1	554444	HEADER, DOUBLE, 2 X 36	65610-4-72..	22526

	A
	B
	C
	D
	E
	F
	G



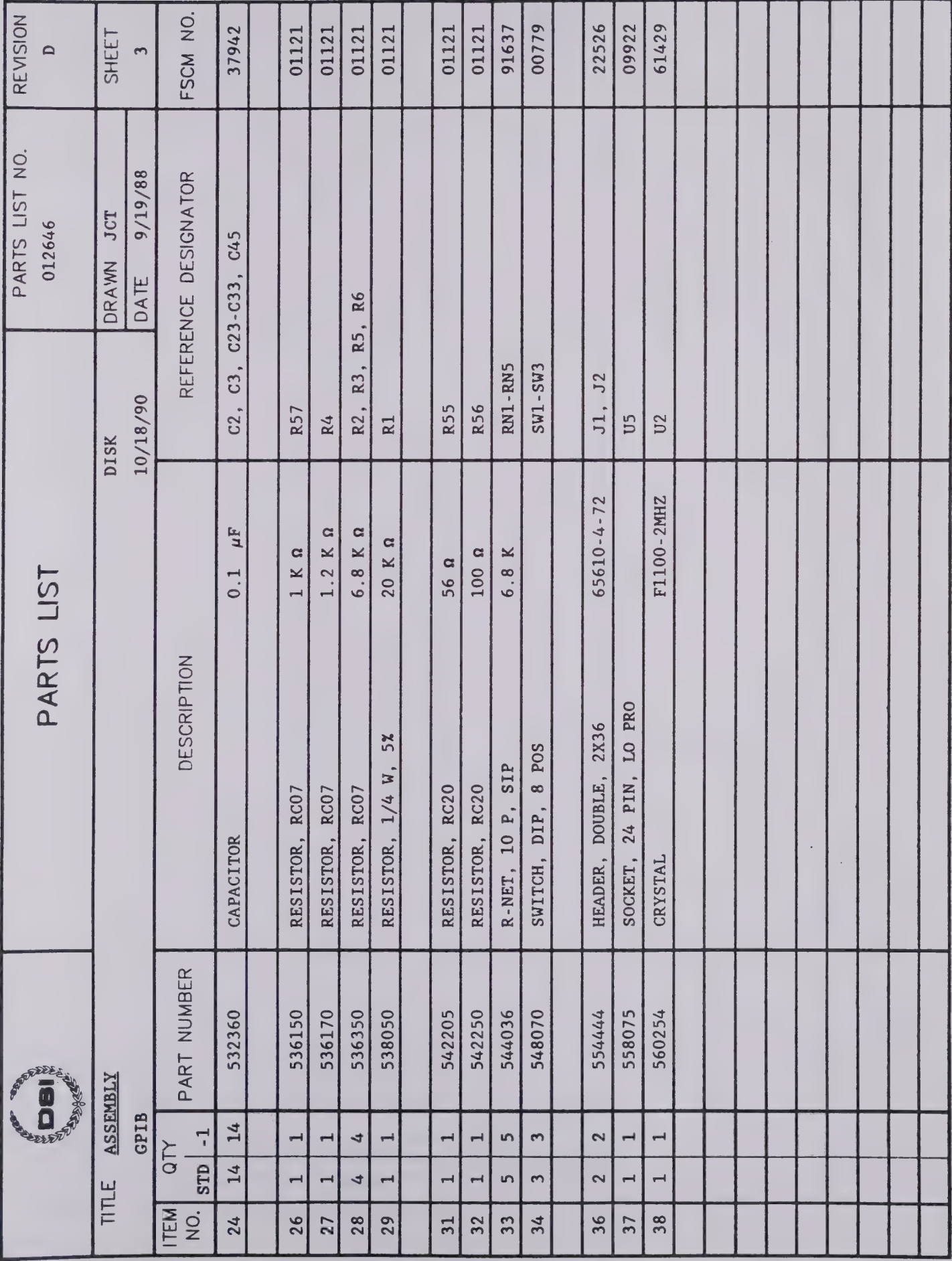
- | | |
|---|---|
| Δ | Δ |
|---|---|

	Age
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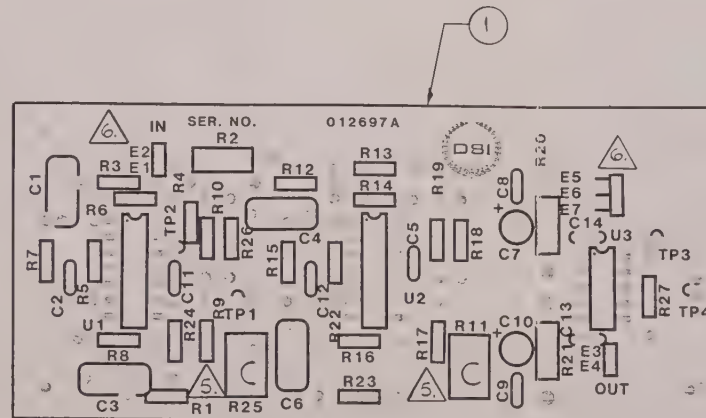


PARTS LIST

				PARTS LIST				PARTS LIST NO. 012646		REVISION D
TITLE ASSEMBLY GPIB				DISK 10/18/90		DRAWN JCT DATE 9/19/88		SHEET 2		
ITEM NO.	QTY STD	QTY -1	PART NUMBER	DESCRIPTION	REFERENCE DESIGNATOR	FSCM NO.				
1	1	1	468730	CIRCUIT BOARD	013330	55744				
2	1	1	502050	INTEGRATED CIRCUIT	7404	01121				
3	2	2	502200	INTEGRATED CIRCUIT	7437	01121				
4	1	1	507000	INTEGRATED CIRCUIT	74LS00	18324				
6	1	1	507014	INTEGRATED CIRCUIT	74LS14	18324				
7	2	2	507138	INTEGRATED CIRCUIT	74LS138	18324				
8	1	1	507139	INTEGRATED CIRCUIT	74LS139	18324				
9	6	6	511244	INTEGRATED CIRCUIT	74HCT244	18324				
11	2	2	511374	INTEGRATED CIRCUIT	74HCT374	18324				
12	1	1	512565	INTEGRATED CIRCUIT	TMS9914A	01295				
13	1	-	512621	INTEGRATED CIRCUIT	2732A	18324				
	-	1	512621	INTEGRATED CIRCUIT	2732A	18324				
14	1	1	512680	INTEGRATED CIRCUIT	Z80A	33297				
16	1	1	514307	INTEGRATED CIRCUIT	TMS2016	68102				
17	1	1	516060	INTEGRATED CIRCUIT	75160	18324				
18	1	1	516061	INTEGRATED CIRCUIT	75161	01295				
19	1	1	520065	TRANSISTOR	2N2270	04713				
21	1	1	522180	DIODE	1N4148	01295				
22	1	1	530075	CAPACITOR	33 μF	37942				
23	1	1	530080	CAPACITOR	47 μF	37942				



REVISION			
DATE	SYM	DESCRIPTION	APPROVED
6-9-89	A	PROD REL W.O # 1214	<i>[Signature]</i>
7-7-89	B	ECO D-3040 GH	<i>[Signature]</i>
11-3-90	C	ECO-3549 GH	<i>[Signature]</i>

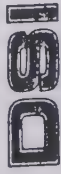


6. FOR -I ONLY: INSTALL COAX CABLE ASSY (012774-19) @ E1 (C) & E2 (SH) & PWR CABLE (012775-24) @ E5 & E7.
5. FOR -I ONLY: JUMPER @ R11 & R25 AS SHOWN.
4. FOR -I ONLY: DO NOT INSTALL R4, R6, R11, R13, R14, R25.
3. FOR -I ONLY: CUT OFF OUTSIDE PIN. OF RT ANGLE HEADER @ E3 & E4.
JUMPER CUT PIN TO THE MIDDLE PIN WITH BUSS WIRE.
2. FOR SCHEMATIC SEE DWG NO. 015458.
1. ASSEMBLE PER DSI WORKMANSHIP MANUAL NO. 005.

NOTES:

SEE SEPARATE LISTS (P/L)

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES TOLERANCE ON DECIMALS ANGLES XX = ± .XX .25° XX.X = .005 ✓ EACH SURF. ROUGHNESS DO NOT SCALE PRINT		DSI DECOM SYSTEMS INC. 340 RANCHEROS DR. SAN MARCOS, CALIF. 92068 DATE: <i>6. HAYES</i> CHECKED: <i>[Signature]</i> DRAWN: <i>[Signature]</i> TITLE: <i>ASSEMBLY</i> PART: <i>NOTCH FILTER</i> QUANTITY: <i>7132</i> FINISH:	
CORE IDENT	SCALE	DWG NO	REV
55744	2:1	012697	C



FSCM
55744

PARTS LIST

PL NO. 012697

REV. C

LTR

TITLE

ASSEMBLY
NOTCH FILTER

DISK

12/10/90

APP. BY

DATE 6/12/89

DWN. BY KK

DATE 5/25/89

SHEET

1 OF 3

LTR

REVISIONS

DATE

DWN

NEXT ASSY.

NEXT PL.

MODEL NO.

7132

P1 PRELIMINARY RELEASE
A PRODUCTION RELEASE
B INCORP ECO D-3040
C INCORP ECO D-3549

KK
FWC
GH
GH

5/25/89
6/9/89
7/24/89
12/10/90

DWG NO.

TITLE

REFERENCE DRAWINGS

015458

SCHEMATIC

-1

STD

10 KHz LOW PASS FILTER

27.7 KHz NOTCH FILTER

FSCM
55744

PARTS LIST

TITLE ASSEMBLY NOTCH FILTER			DISK 12/7/90		PARTS LIST NO. 012697	REVISION C
ITEM NO.	QTY STD -1	PART NUMBER	DESCRIPTION	REFERENCE DESIGNATOR		
1	1	468759	PWB	013359		
2	2	514086	I.C., OP AMP, QUAD WIDEBAND	LF347BN	U1, U2	55744
3	1	514331	I.C., DIP	LH0002CN	U3	12040
4	4	528220	CAPACITOR, DIP MICA, 3300 pF	DM19-332J	C1, C3, C4, C6	84171
5	- 1	541239	RESISTOR, 2.43 K Ω	RN55C2431F	R22	91637
6	2	530060	CAPACITOR, TANTALUM, 15 μ F	T361C156K035AS	C7, C10	37942
7	8	532360	CAPACITOR, CERAMIC, .1 μ F	SR205E104MAA	C2, C5, C8, C9, C11-C14	51406
8	2	536090	RESISTOR, CF, 1/4 W, 5%, 560 Ω	RC07GF561J	R26, R27	01121
9	2	541219	RESISTOR, 1.50 K Ω	RN55C1501F	R1, R23	91637
10	- 1	541255	RESISTOR, 3.57 K Ω	RN55C3571F	R1	91637
11	2	541225	RESISTOR, 1.74 K Ω	RN55C1741F	R7, R15	91637
12	1	541297	RESISTOR, 9.76 K Ω	RN55C9761F	R10	91637
13	9	541298	RESISTOR, 10 K Ω	RN55C1002F	R4, R6, R8, R9, R13, R14, R16, R17, R19	91637
	-	541298	RESISTOR, 10 K Ω	RN55C1002F	R3, R8, R9, R10, R16, R17, R18, R19	91637
14	1	541306	RESISTOR, 12.1 K Ω	RN55C1212F	R24	91637
15	- 2	541254	RESISTOR, 3.48 K Ω	RN55C3481F	R7, R24	91637
16	1	541308	RESISTOR, 12.7 K Ω	RN55C1272F	R18	91637
17	- 1	541252	RESISTOR, 3.32 K Ω	RN55C3321F	R23	91637
18	2	541345	RESISTOR, 30.9 K Ω	RN55C3092F	R5, R22	91637
19	2	541382	RESISTOR, 75 K Ω	RN55C7502F	R3, R12	91637
20	- 1	541226	RESISTOR, 1.78 K Ω	RN55C1781F	R5	91637
21	2	542205	RESISTOR, CF, 1/2 W, 5%, 56 OHM	RC20GF560J	R20, R21	01121
22	1	542220	RESISTOR, CF, 1/2 W, 5%, 75 OHM	RC20GF750J	R2	01121
23	2	543080	POTENTIOMETER, 500 OHM	68WR500 OHM	R11, R25	73138



PARTS LIST

PARTS LIST NO.	REVISION
012697	C

PARTS LIST NO.
012697

REVISION
C

[illegible]

UNUSED CIRCUITS			REFERENCE DESIGNATOR	
DEVICE	LOCATION	QUANTITY	OUTPUT PINS	LAST USED
TALSDA	U10	1	6	R59
				U20
				C32
				CR4
				Q7

6. NUMBER IN PARENTHESIS REFERS TO SCHEMATIC SHT NO.
5. FOR PCB ASSY. SEE DWG. NO. 012056

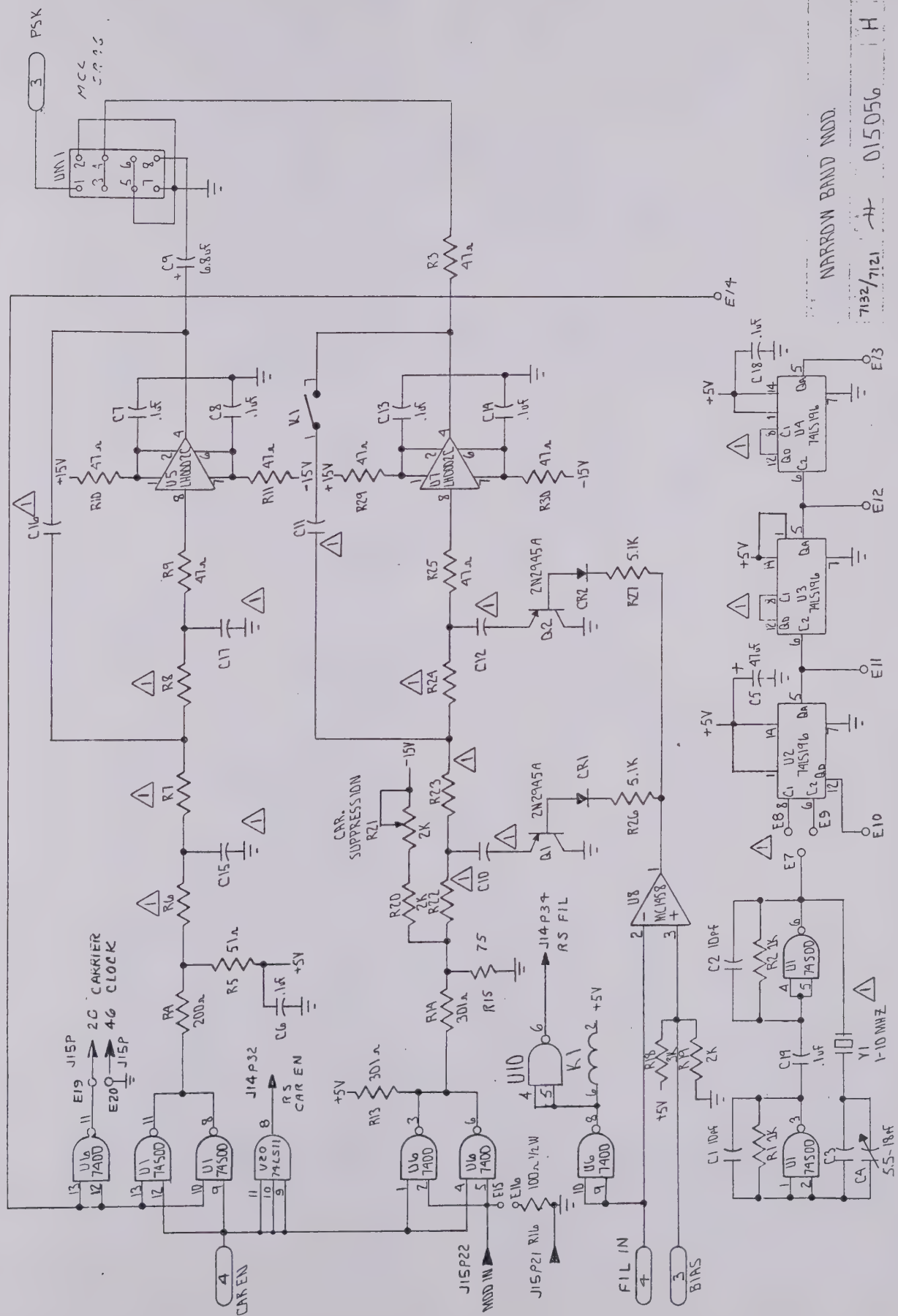
2. POWER STATUS POWER ON DELETE Q6 STD.
POWER ON DELETE Q5, RAT SPEC.

△ FREQUENCY VAR.

NOTE:

REVISIONS			APPROVED
ITEM	DESCRIPTION		
A	Initial ECO D-0214		
B	D-1284 GLG 6-24-83		
C	ECO D-2038 GH		
D	ECO D-2439 GH		
E	ECO D-2503 GH		
F	ECO D-2772 JT		
G	ECO D-2993 GH		
H	ECO-4313 JCO GH		

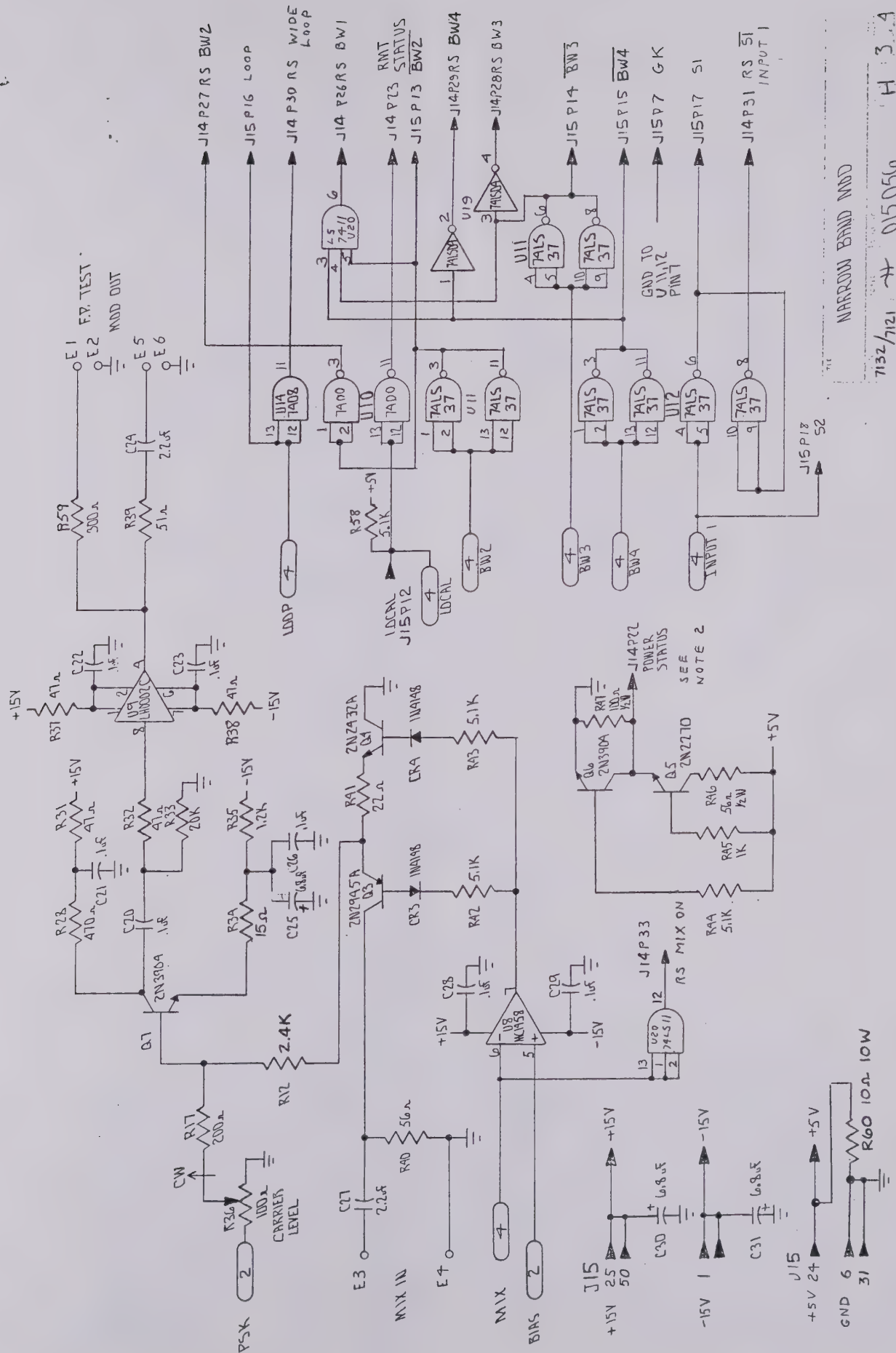
		1404 BISCANSO RD. SAN MARCOS, CALIF. 93801	
CODE 10147 55744	DATE FWC 1/77 APP C. Robertson	CDB J. Johnson 1/15/77	TYPE NARROW BAND MOD
REVISION 7132/7121	DRAWING NO. 015056	DATE H 1	SHEET L 4



NARROW BAND MOD.

7132/7121 H 2 A

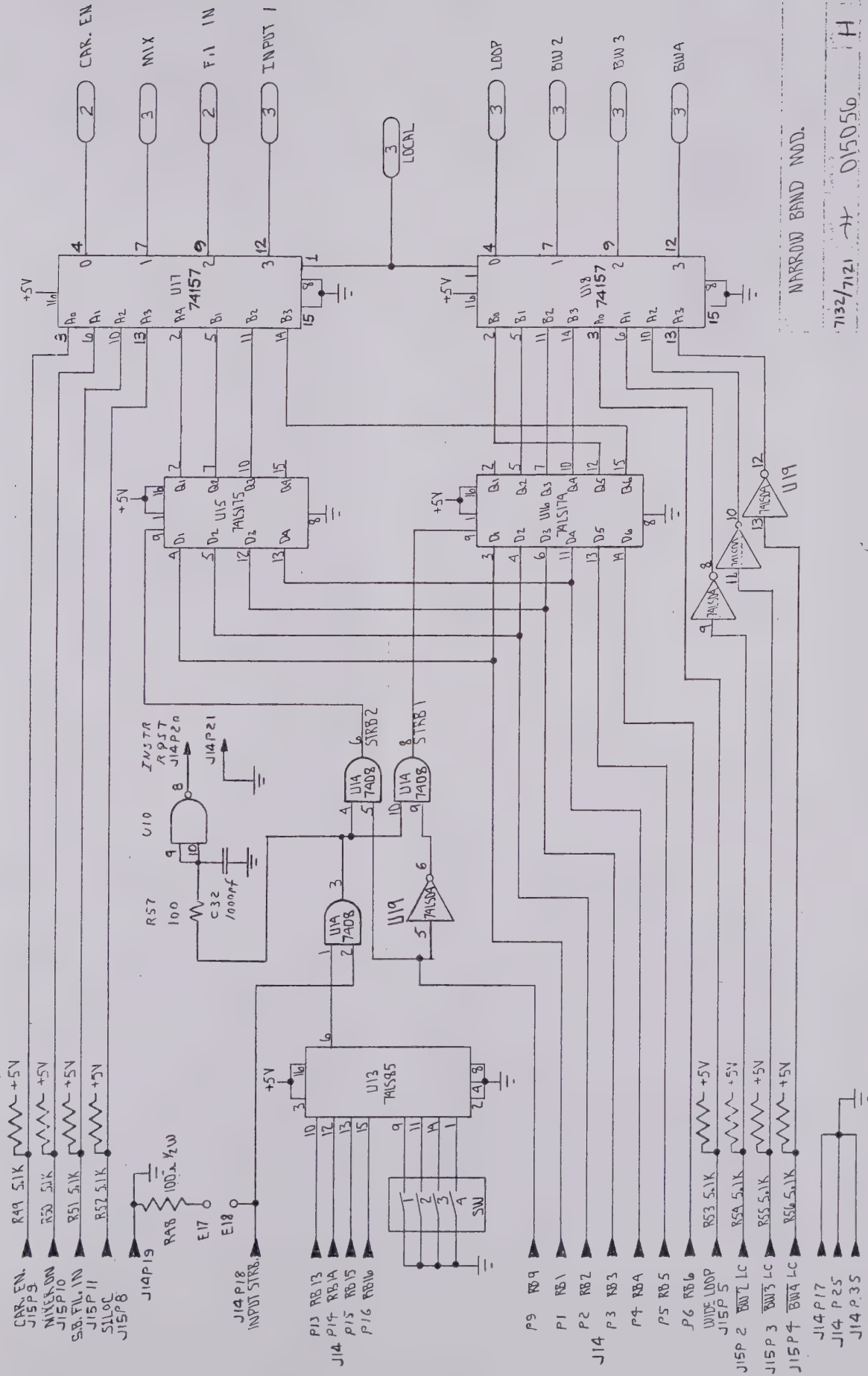
015056



NARROW BAND MOD

7132/7121 # 015056

H 3.4



NARROW BAND MOD.

7132/7121 → 015056 H 4 4

UNUSED CIRCUITS			REFERENCE DESIGNATOR	
DEVICE	LOCATION	QUANTITY	INST USED	UNUSED
			R223	R67, R217, R222
			C105	C101, C102
			U116	
			U113	
			Q26	
			C119	
			K12	
			TP8	
			L5	

B. NUMBERS IN BUBBLES REFER TO SCHEMATIC PG.:

FOR PC BOARD ASSY. SEE DUG. NO. 012057

A. CONNECT E9 TO E10 E11 TO E12 E13 TO E14 VIA
*26 TWISTED TRIPLE WIRE

A. CONNECT E19, 20 TO E18 VIA R617A CABLE.

A. C4's $\geq 3.0 \text{ MHz}$, INSTALL ALL COMPONENT S1.5, E15 TO E16 OPEN,
E17 TO E18 OPEN, E5 TO E6 JUMPED, INSTALL R65.

C4's $\leq 3.0 \text{ MHz}$ DELETE ALL COMPONENTS RIGHT OF DASHED LINE SMT. 5, DELETE R65,
E5 TO E6 OPEN, JUMPER E15 TO E16 AND E17 TO E18.

A. REMOVE JUMPER TO DISABLE AGC (TEST PURPOSES ONLY)

3. COMPONENTS WITHOUT VALUES SHOWN ARE FREQ. VARIABLES

2. ALL RESISTORS ARE IN OHMS, 10^3 , 10^4 , 5%

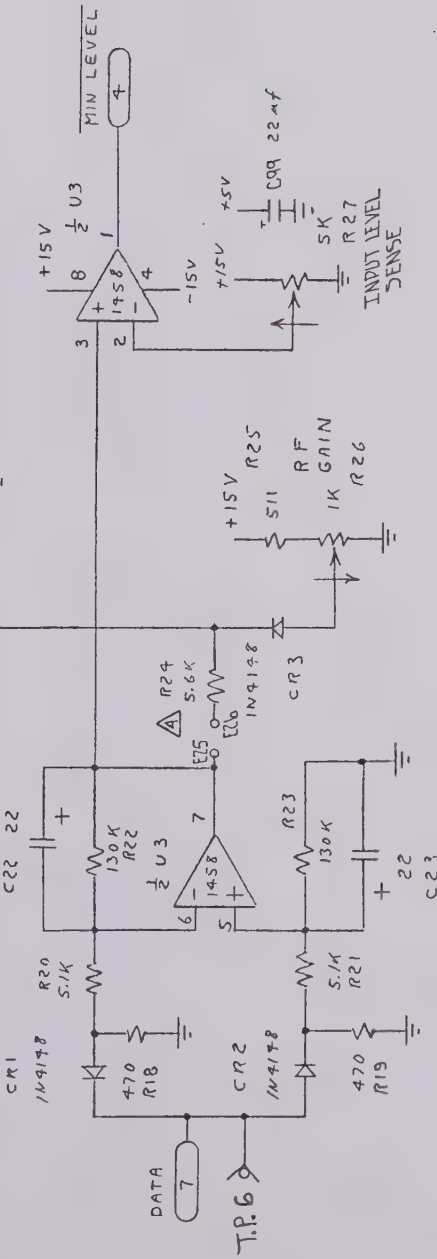
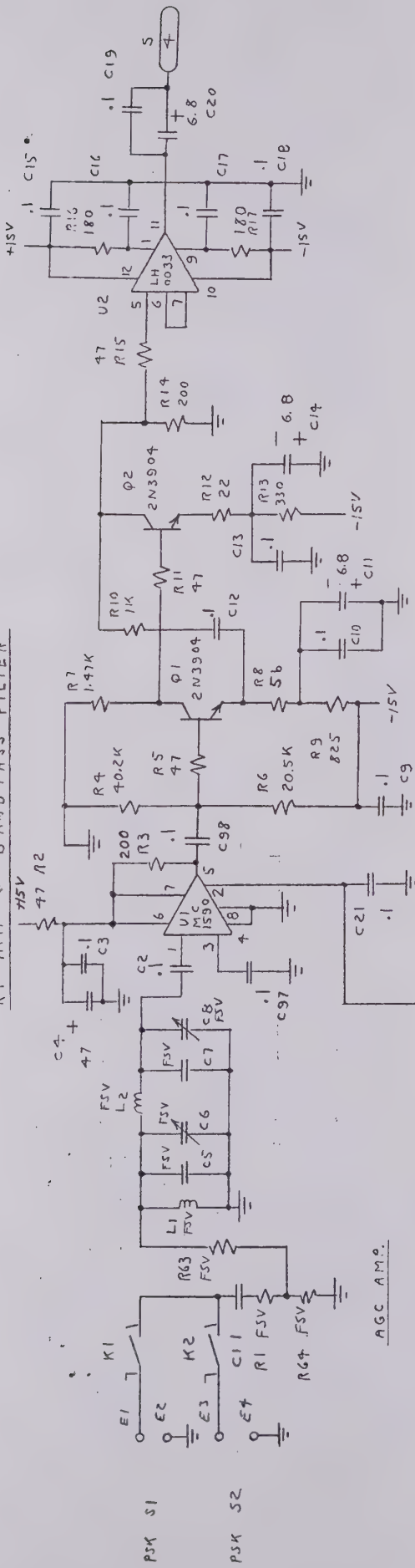
1. ALL CAPACITORS ARE IN MICROFARADS

NOTES: UNLESS OTHERWISE SPECIFIED

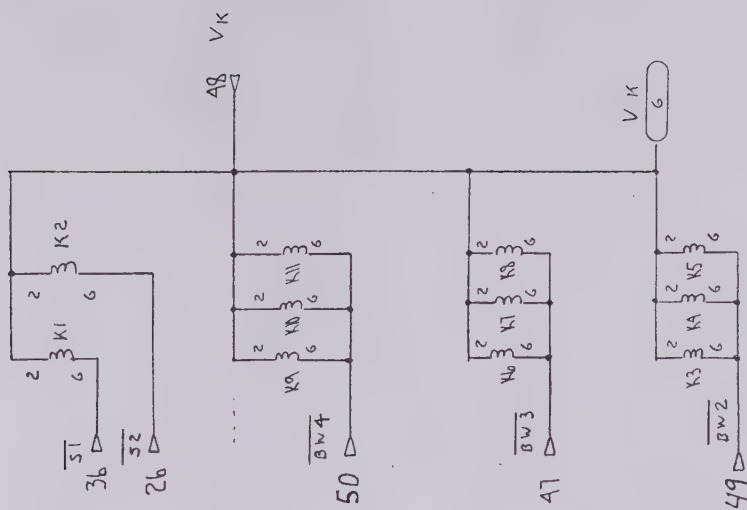
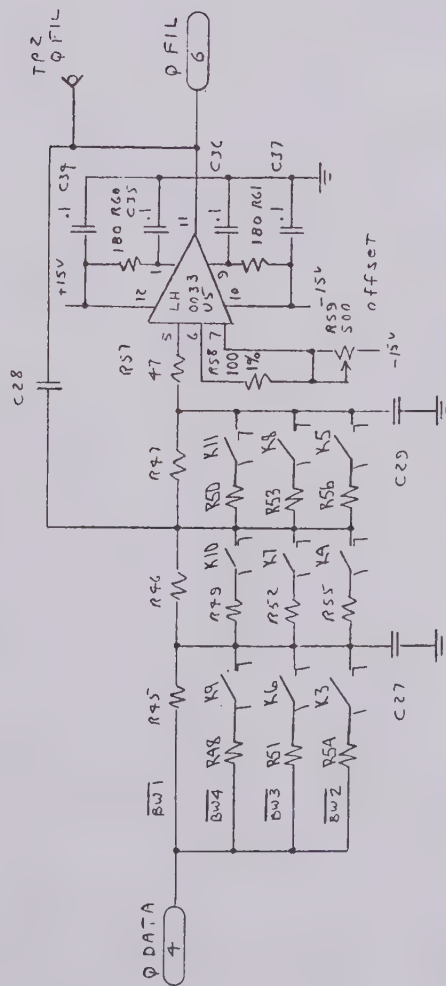
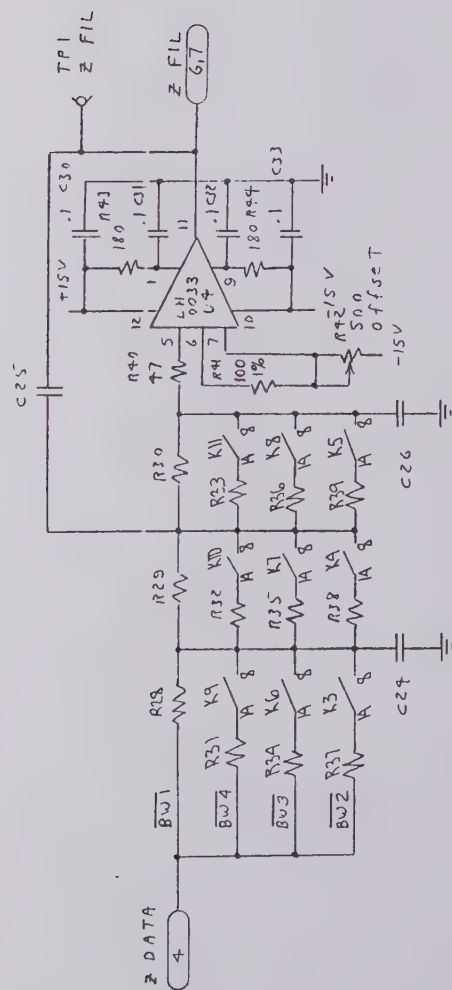
SYM	REVISIONS		APPROVED
	DESCRIPTION		
A	D-0236 SHTS 2 & 5 AFE	Edo 7/1/77	
B	D-0326 SHTS 3 & 5 ED 1/2/77		
C	D-0376 FWC 10-4-79		
D	D-0417 FWC 1-18-80		
E	D-0464 FWC 1-23-80		
F	D-0484 FWC 1-31-80		
G	D-0816 FWC 4-16-82		
H	D-0903 FWC 8-18-82		
I	D-0890 FWC 9-29-82		
J	D-1256 GLG 6-27-83		
K	D-2334 GH		
L	D-2428 GH		
M	D-2696 GH		
N	D-3679 GH		
P	ECO-4113 GH		

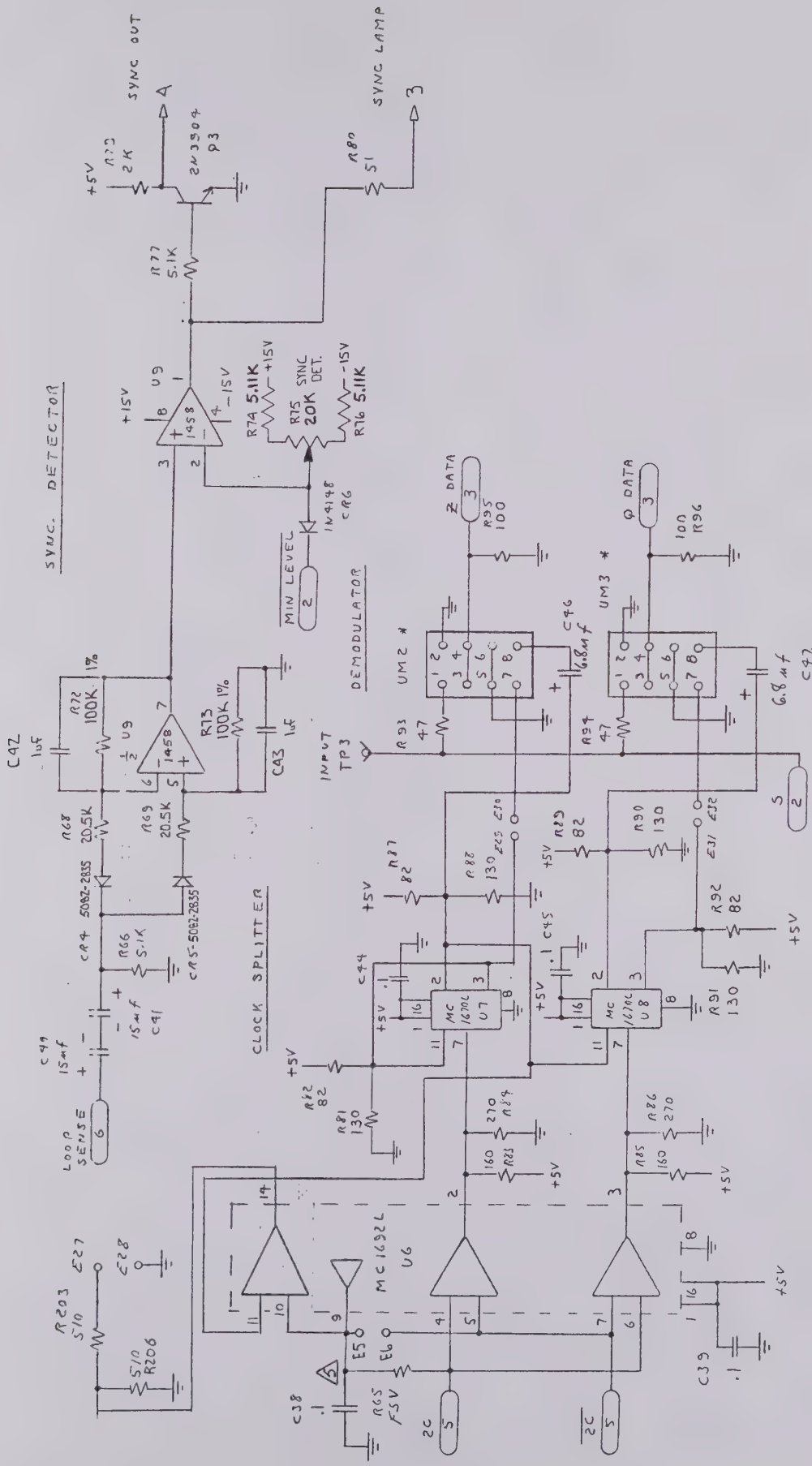
		1484 DESCANSO RD. SAN MARCOS, CALIF. 92869	
		DATE 55744	CDR C. H.
TITLE PSK DEMODULATOR		DATE 8/11/77	SHEET 1 of 1
SCALE 7132	PART NO. 015057	REV. P	DRAWN L. J.

RF AMP & BAND PASS FILTER

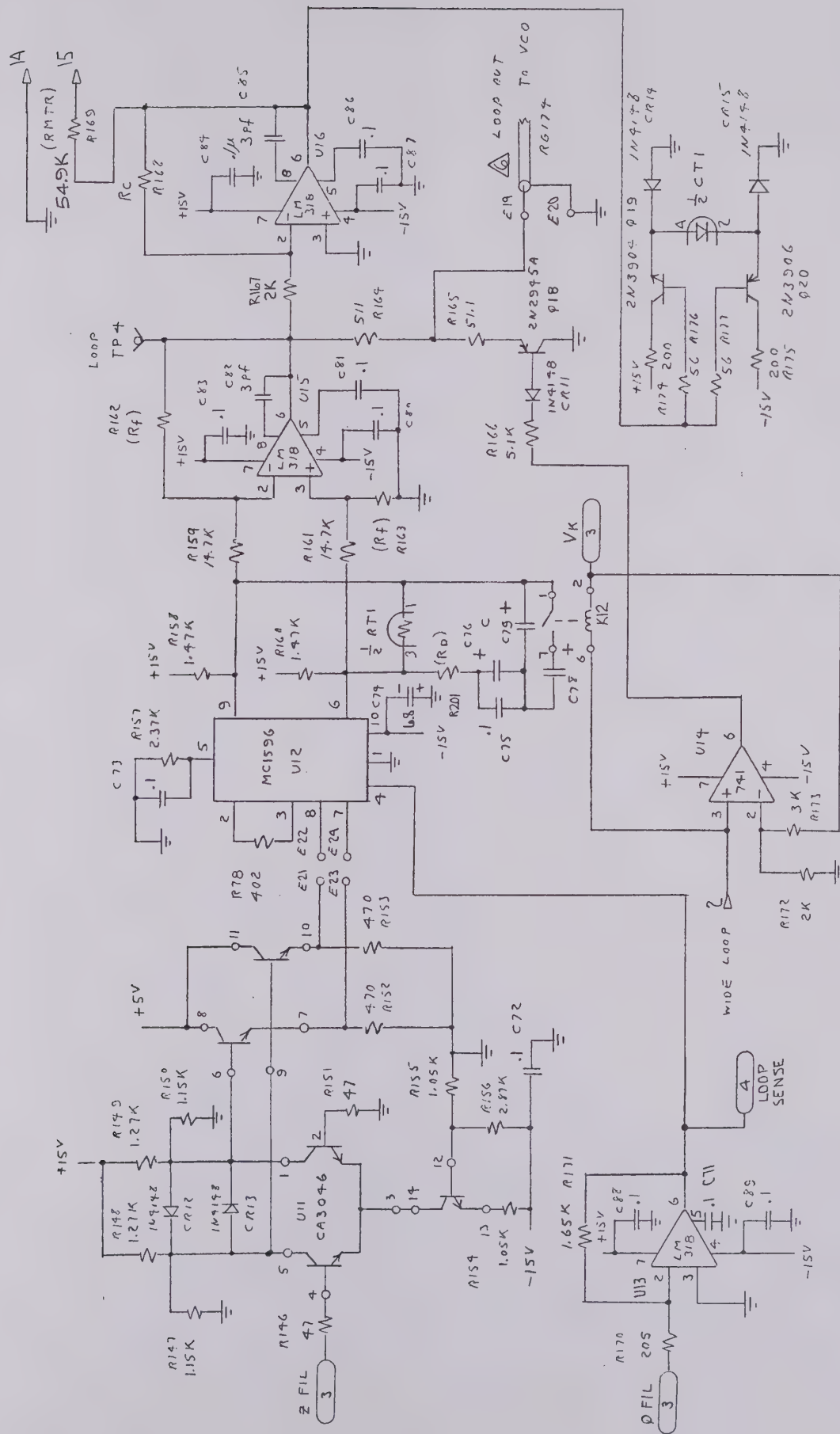


PSK DEMODULATOR





PSK DEMODULATOR



RSK DEMODULATOR

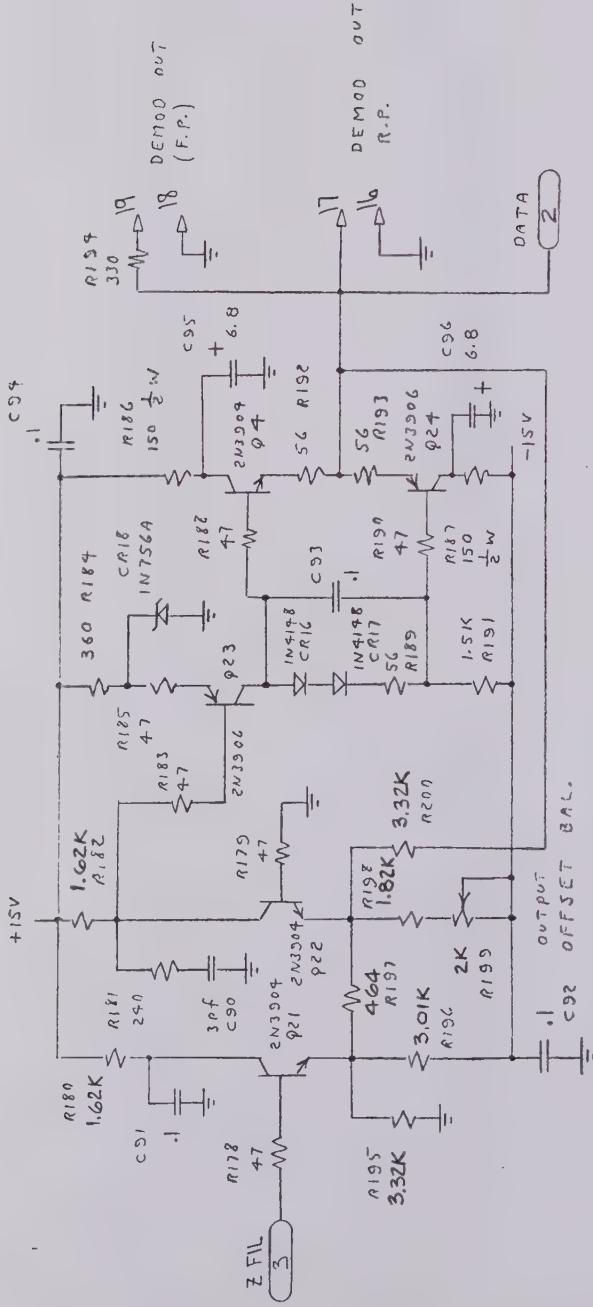
7/32

015057

P

6.2

OUTPUT AMP



PSK DEMODULATOR

7132

015057

P 7 7

UNUSED CIRCUITS				REFERENCE DESIGNATOR	
device	locator	qty.	output pins	last used	unused
				U13	
				R96	
				C57	
				Q15	
				CR8	CR2
				Y2	
				M2	
				L10	L6
				E18	E11,12,13,14

8. MODULATOR W/O COMPUTER INTERFACE
 DELETE ALL COMPONENTS ON SHT 5 EXCEPT U7, U12, U13,
 R77-79, R83, R86-89
 ADD JUMPERS- U104, U11 PINS 3 to 4, 6 to 7, 9 to 10 & 12 to 13.

7. W/O MODULATOR / WITH COMPUTER INTERFACE -
 DELETE ALL COMPONENTS ON SHT 3 EXCEPT C41, C42, C43, & U13.
 DELETE ALL COMPONENTS ON SHT 4.

6. W/O FREQ. CONVERTER, DELETE ALL COMPONENTS ON SHT 2.

5. FOR PC BOARD ASSY. SEE 012060

4. NUMBERS IN PARENTHESIS REFER TO SHEET NOS.

3. ALL DIODES ARE 1N4148.

2. ALL RESISTORS ARE IN OHMS, 1/4 WATT, ±5%.

1. ALL CAPS ARE IN MICROFARADS.

NOTES: UNLESS OTHERWISE SPECIFIED

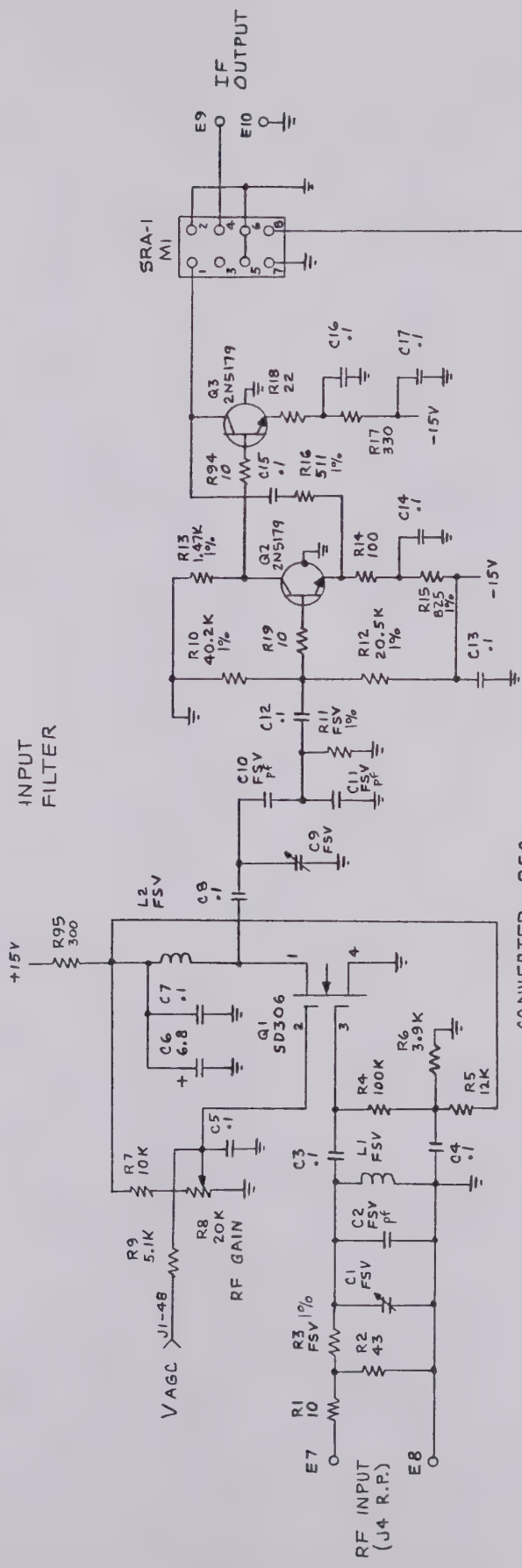
ITEM	DESCRIPTION	REV	DATE
A	ECO D-1589 GH 4-2-85	10/15	11/15/85
B	ECO D-2784 JT 11-15-85	10/15	11/15/85

SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
REV STATUS																				
SHEET	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
REV STATUS																				

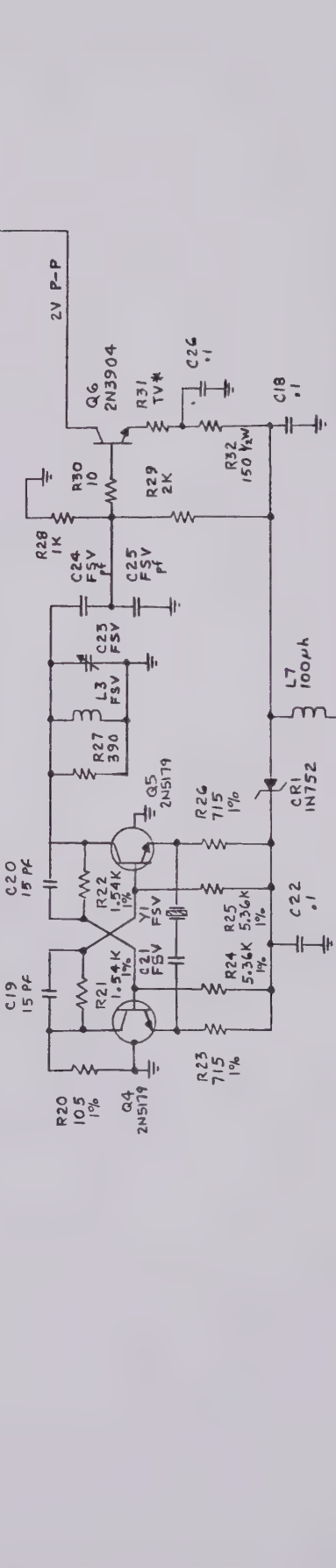
TOLERANCE: ±.000
 DIMENSIONS ARE IN INCHES
 FINISH: 100%
 SURF: 100%
 DO NOT SCALE PRINT

DSI DECOM SYSTEMS INC.
 1404 DEBCANBO RD. SAN MARCOS, CALIF. 92069
 DRAFT Eude 12/12/78
 APPR CA 3-19-84
 TITLE SCHEMATIC-
 WIDE BAND MODULATOR
 CODE IDENT 55744
 SHEET NO 015060
 REV B
 1 of 1

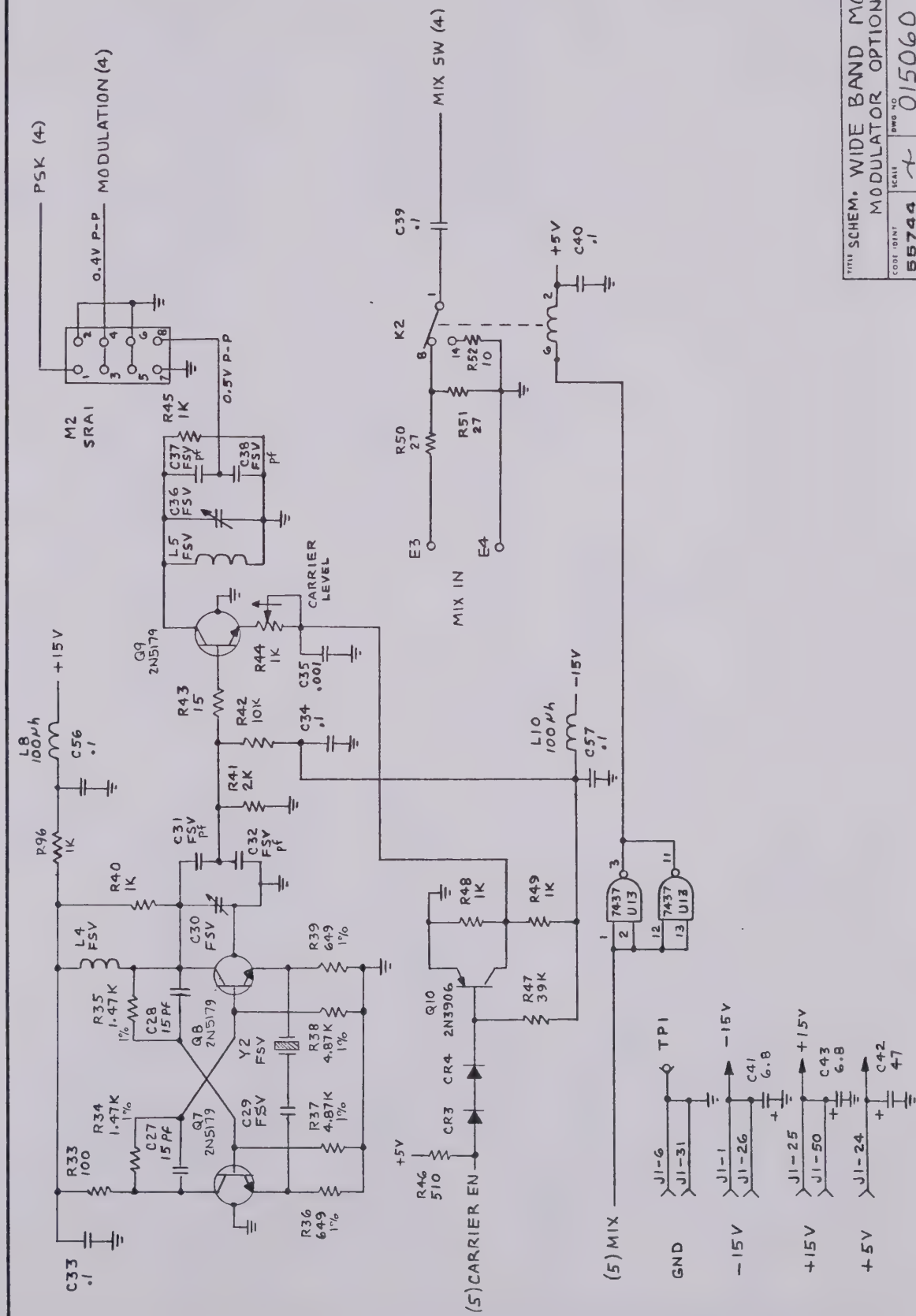
INPUT FILTER



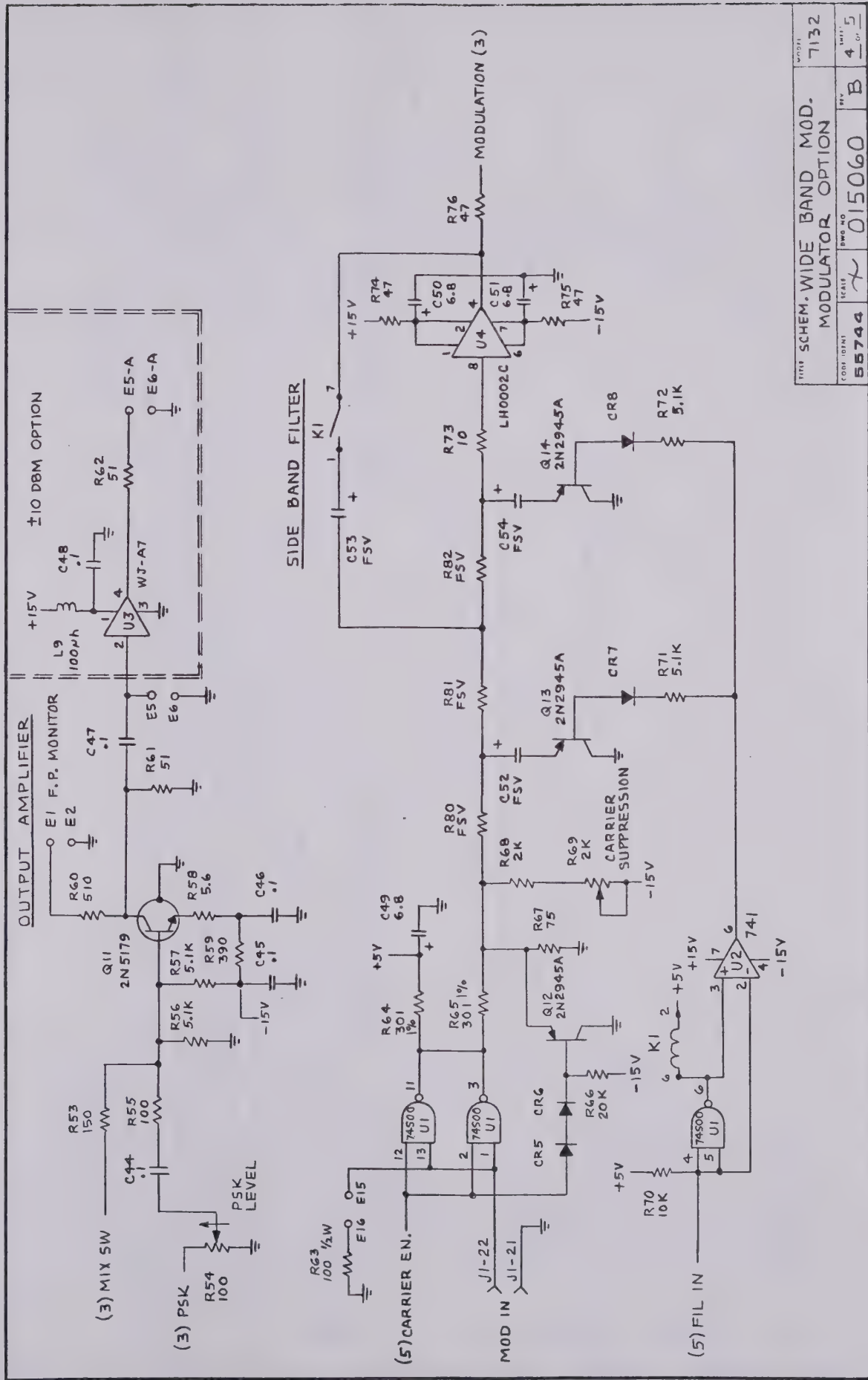
CONVERTER OSC.

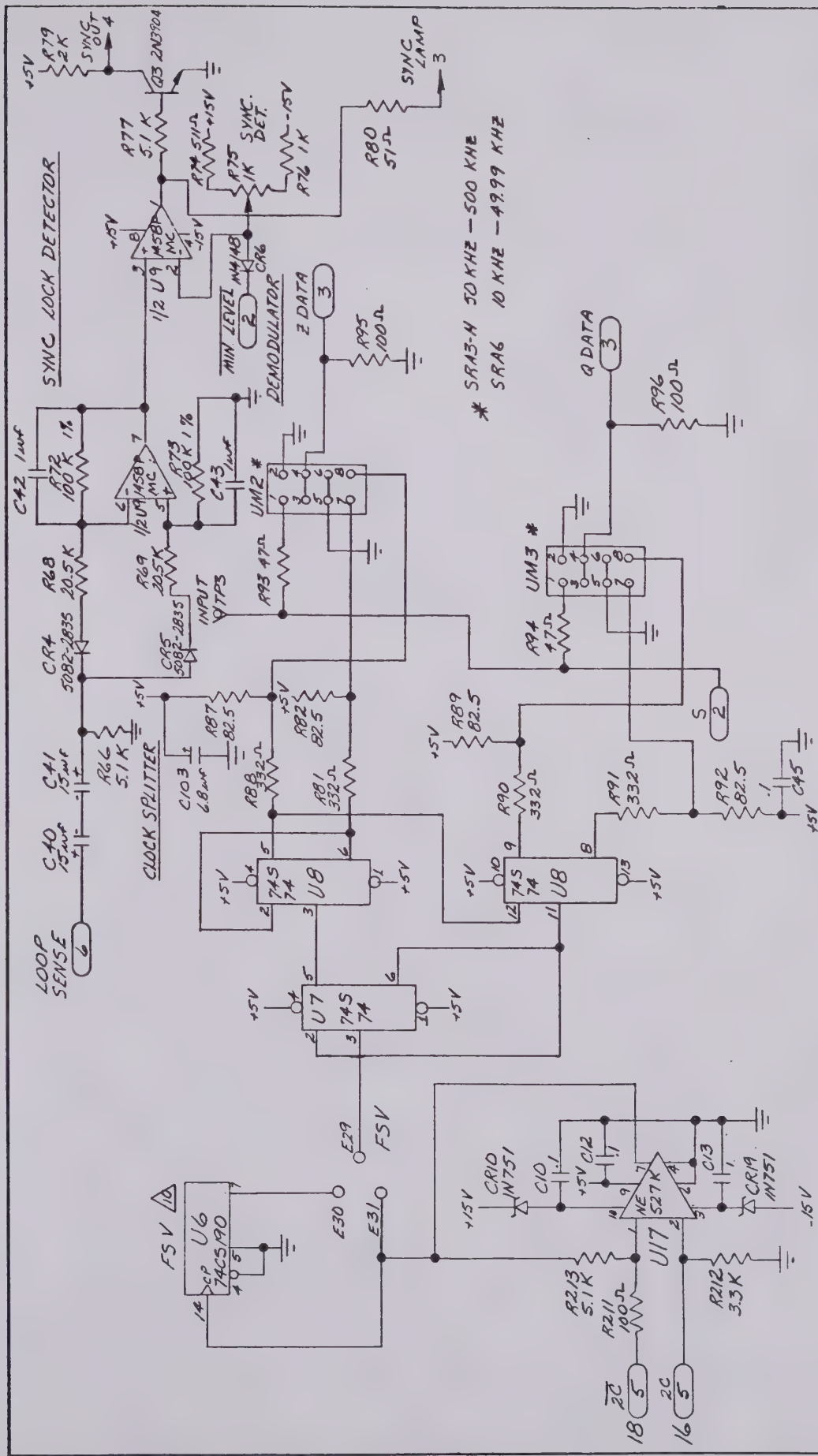


* TEST VARIABLE				56744				015060				B				7132				2005			
SCHEM.- WIDE BAND MOD.				FREQ. CONVERTER OPTION																			
TITLE				CODE				REV				DATE				BY				CHKD			



TITLE SCHEM. WIDE BAND MOD. MODULATOR OPTION				WORK
CODE (INT)				7132
SCALE				100%
55744				REV
015060				B
3.0				2





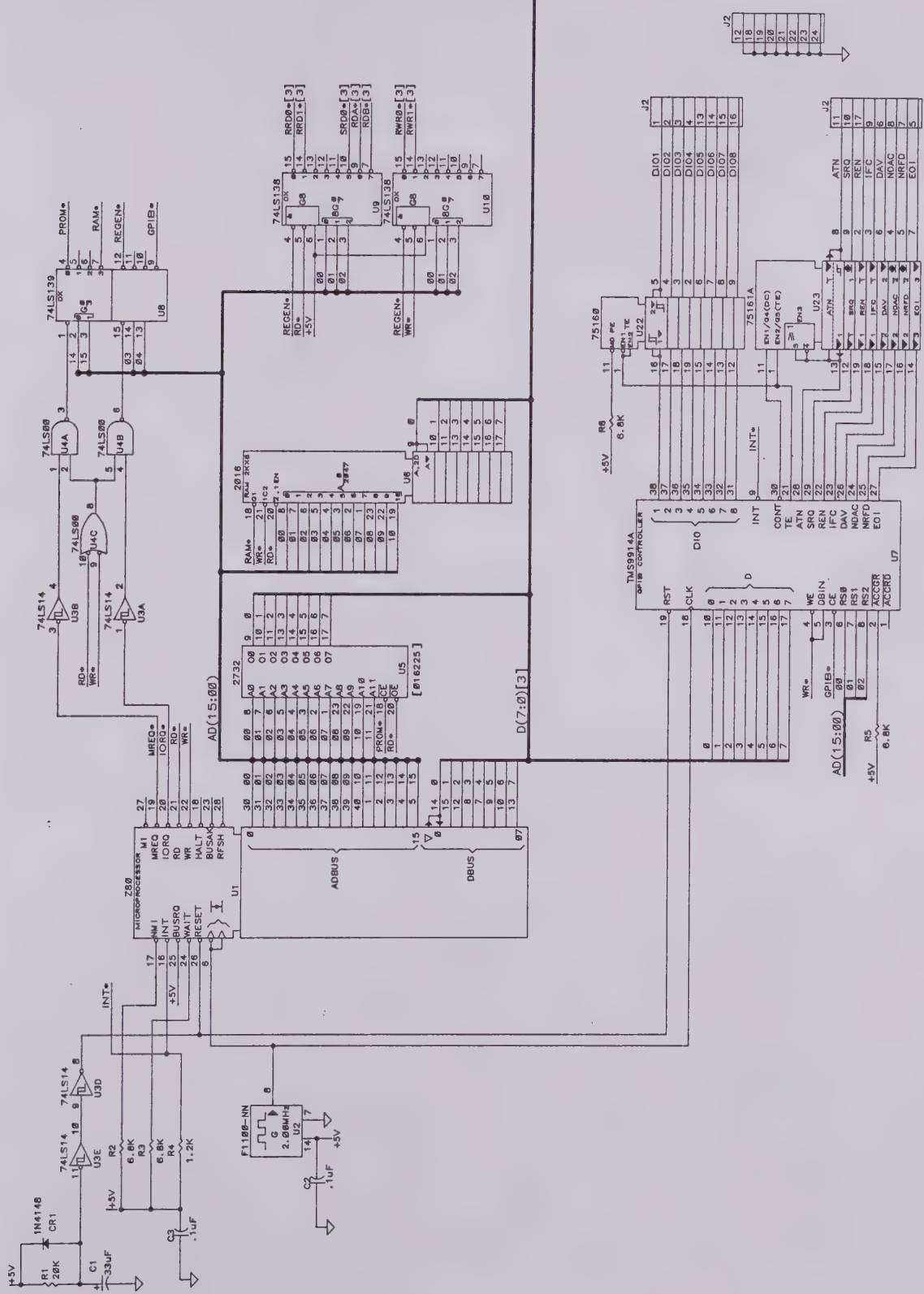
TITLE	NARROW BAND PSK DEMODULATOR	REV	F	DATE	7/32-006
CODE	10101	SCALE	1	Q15150	10.1
56744					

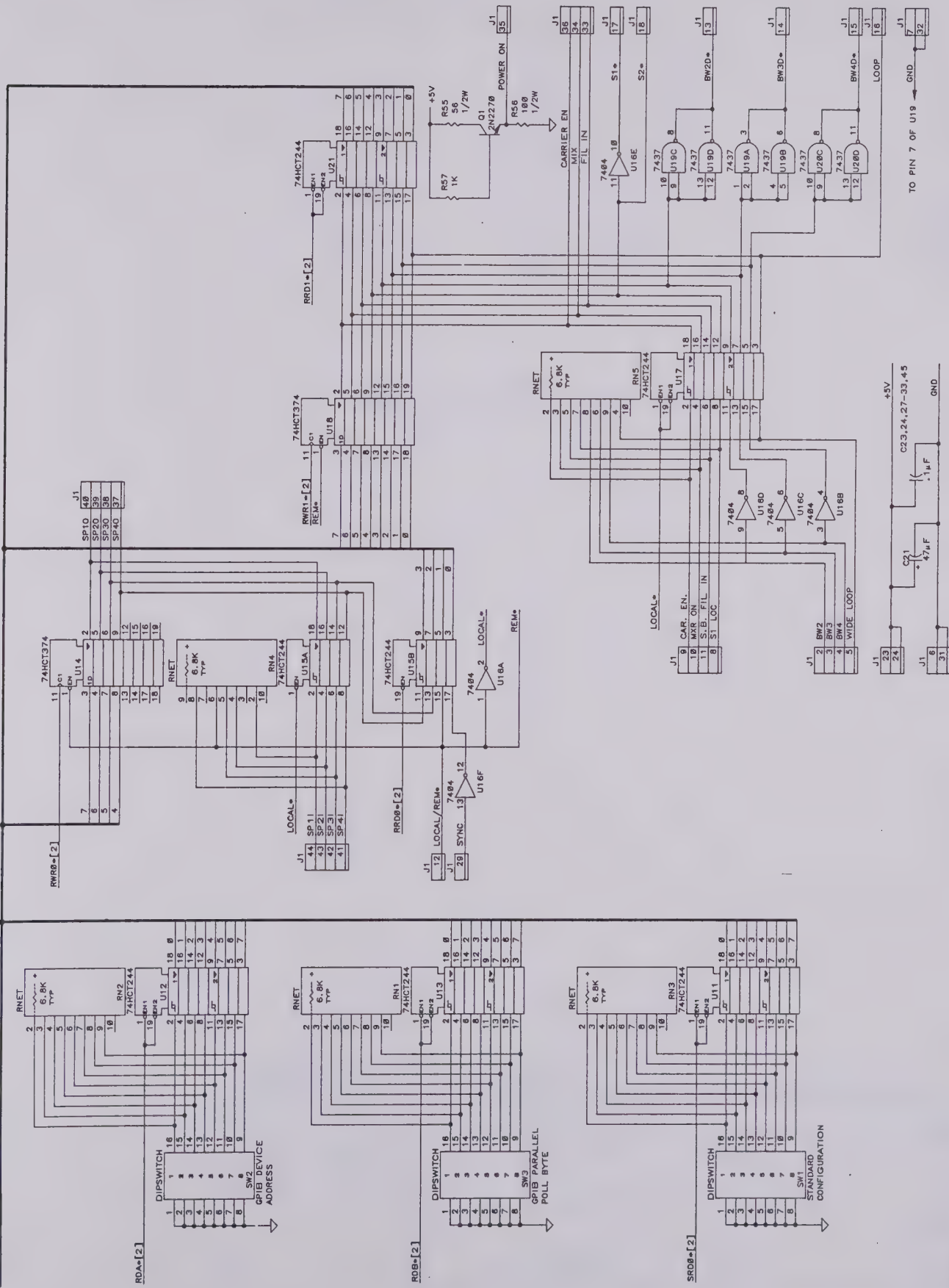
7132 IEEE-488 OPTION

5. FOR PC BOARD ASSY SEE NO. 012646.
 4. NUMBERS IN PARENTHESIS REFER TO SHEET NUMBERS.
 3. ALL DIODES ARE IN4148.
 2. ALL RESISTORS ARE IN OHMS, 1/4 WATT, $\pm 5\%$.
 1. ALL CAPS ARE IN MICROFARADS.
- NOTES -- UNLESS OTHERWISE SPECIFIED

7132 8/18/83 OPTION
1. 8/18/83 REV A
18 SEPT 83

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES DECIMALS FRACTIONS ANGLES 2 3/4 3/32 = 0.094 3/16 = 0.188 3/8 = 0.375 1/2 = 0.500 3/4 = 0.750 1 = 1.000 DO NOT SCALE PRINT		DSI DECOM SYSTEMS INC. 340 RANCHEROS DR. SAN MARCOS, CALIF. 92068 STATE FWC TITLE SCHEMATIC CODE 0371 88744 1/1 015423 REV A 1.3	
--	--	--	--



$$D(7:\emptyset)[2]$$


7132 OFFIS OPTION
3 015423 REV A
10 SEPT 88

REVISION			
DATE	SYM	DESCRIPTION	APPROVED
	A	INCORP. ECO D-0236	FWC
	B	INCORP. ECO D-0566	FWC
	C	INCORP. ECO D-0739	CN
	D	INCORP. ECO D-0938	FWC
	E	INCORP ECO E-D-1311	AFN
	F	INCORP ECO D-1502	GH <i>FWC</i>
	G	INCORP ECO D-1667	GH <i>FWC</i>
	H	INCORP ECO D-1968	
10/3/88	J	INCORP ECO D-2706	
3/28/89	K	INCORP ECO D-2867, D-2925	
10/5/89	L	INCORP ECO D-3062	
8/24/93	M	INCORP ECO 4113 <i>✓ gcs</i>	

TEST PROCEDURE
FOR DSI MODEL 7132
PSK MODEM

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES TOLERANCE ON DECIMALS ANGLES XX = ± .010 ± 30' XXX = ± .005 ✓ MACH SURF ROUGHNESS DO NOT SCALE PRINT		DSI DECOM SYSTEMS INC. 340 RANCHEROS DR. SAN MARCOS, CALIF. 92069			
MATL	DRAFT	CAC	CHECK	CN	
	APPR	CN <i>C. Hetherton</i>	REL	2/8/78	
FINISH	TITLE				MODEL
	TEST PROCEDURE - PSK MODEM				7132
	CODE IDENT	SCALE	DWG NO.	REV	SHEET
	55744		019110	M	1 of 31

1-0 GENERAL

This procedure outlines the "in house" calibration procedure for the PSK Modem and PSK Demodulator.

2-0 REQUIRED TEST EQUIPMENT

O-Scope	TEK 475
Counter	TEK DC501
DVM	TEK DM501
Oscillator	TEK FG502
Oscillator	TEK SG503
True R. M. S. DVM	HP 3403C
PSK Modulator	DSI*

*In house test fixture calibrated at time of test using external equipment.

The equipment listed above may be substituted for equivalent equipment. Additional equipment may be used!

Verify cal. stickers (IN DATE).

CHECK OK _____

3-0 CAUTION

Use particular care when working on or near the A-C primary wiring.

This test should only be performed by qualified electronics personnel.

4-0 DC POWER ADJUSTMENT

Using a TEK DM501 measure the following supply voltages and adjust, if necessary, within the following limits.

Measure Point at Demod. Board

Pin 12
-15V +0.75V

Pin 1
+15V +0.75V

Pin 46
+5 +0.25V

CHECK OK _____

TITLE TEST PROCEDURE- PSK MODEM				MODEL 7132	
CODE IDENT 55744	SCALE	DWG NO. 019110	REV M	SHEET 2 OF 31	

4-1 TEMPERATURE CYCLE

This test is intended as a factory test and not required for periodic recalibration.

Place the 7132 in a temperature chamber; no functional tests are performed during temperature cycle.

- A. Burn-in operate the unit with power on for 8 hours at +50°C. CHECK OK _____
- B. Do 3 cycles of -30° C for 15 minutes and +50° C for 45 minutes. CHECK OK _____

5-0 PSK DEMODULATOR

Applicable documents:

SCHEMATIC #015057 or #015150 } For narrow band demod
ASSEMBLY #012057 #012182 }

NOTE: For the 10 K ohm input impedance option on the #012182 NB Demod, the input level to J4, J5 is 0.5 V p.p. to 10 V p.p.

5-1 INPUT FILTER

If the Frequency Converter Option is supplied, all refs to Cf in Section 5 refer to the intermediate frequency "IF."

- Remove the Jumper E25 and E26.
- Apply an input signal (sine wave) at 7 mv p.p. to the Demod input at the center frequency to rear panel input J5 (source switch to S2).
- Monitor TP3 with an oscilloscope.
- Calculate the cutoff frequencies of the input filter $\pm 25\%$ of the specified center frequency and record.

-25% CF -25%

- Set R26 so the amplitude is ± 1 V p.p.
- Measure the frequency response of the input filter, trim C6 and C8 so the minimum bandpass (-3 dB cutoff) is wider or equal to $\pm 25\%$ of Cf. Trim range of C6 and C8 which should be 0 to 50% of C5 and C7, respectively.

CHECK OK _____

D-3062 (278a/75a)

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5-2 INPUT AMPLIFIER GAIN

- Return the input signal frequency to Cf.
- Monitor TP3 with an oscscope and adjust R26 so the level at TP3 is 3 v p.p., then readjust to 0.707 V p.p.

CHECK OK _____

Final adjustment of R26 will be done later.

5-3 VCO SECTION

- A. Verify the reference voltages are within tolerance.
 - Q15 emitter -7.05 V to -7.95 V CHECK OK _____
 - Connect a DVM to TP7 and adjust R10 so the voltage is +5.00 V. CHECK OK _____
- B. Set the front panel VCO balence to its approximate center position and install a temporary ground from E7 to E8.
- C. Measure the oscillator frequency at E15, use a Hi Z scope probe with the frequency counter connected to the scope vertical output; this prevents loading of the VCO.

Adjust R106 so the VCO frequency is at its operating Cf. Trim R104, 105 if necessary (range $\pm 25\%$); both resistors must be the same value. Final adjustment will be done later.

NARROW LOOP WIDTH % CF

VCO FREQUENCY

No XVCO 0.1 to 0.3	2X Cf	} For demod assembly 012057 Cf's 500 KHz or greater
With XVCO 0.01 to 0.03	0.2X Cf	
With XVCO .003 or less	0.06 Cf	
No XVCO 0.1 to 0.3	4X Cf	} *(for Cf's 100 KHz to 500 KHz 2.0X Cf *(For Cf's 10 KHz to 99.9 KHz)
With XVCO .03 or less	0.2X Cf	
With XVCO .03 or less	2.0X Cf	

*For Narrow Band Demodulator Assembly 012182

CK _____

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5-4 XVCO SECTION

If the unit includes the XVCO Section, perform the next two steps, otherwise check "NA" and proceed to 5.7.

5-5 XTAL OSCILLATOR

- A. Connect the O-scope to the junction of C69 and C70 and adjust C68 for maximum p.p. amplitude ≈ 1 V p.p.

Note - Depending on the frequency, C68 is either a trimmer or a fixed value (TV), trim if necessary (range 0 to 50% of the installed value). For the Narrow Band Demodulator Assembly, C68 is fixed and this adjustment is made with L5.

NARROW LOOP WIDTH

XTAL OSC. FREQ

0.01 to 0.03
0.003 or less

1.89 X Cf }
1.94 X Cf } For Demod Assembly 012057

CF RANGE

XTAL OSC. FREQ.

100 KHz to 500 KHz
10 KHz to 99.9 KHz

3.8 x Cf }
38 X CF } For Narrow Band Demod
Assembly 012182

CHECK OK _____

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NOTE: The VCO and XTAL oscillator frequencies are mixed in U1. The purpose of the clock filter is to separate the sum frequency and reject the difference. The resulting signal is a sine wave.

- A. Temporarily install R122 180 ohm. Monitor Q12 emitter with the o-scope and counter. Select TV LC56 so the circuit is center turned at 2 X the carrier Cf. Trim range is 0 to 100% of the installed value of C57. Use the front panel VCO balance if necessary to set the frequency with $\pm 0.01\%$ of 2 X Cf.

For the Narrow Band Demodulator Assembly, select TV C56 so the circuit is center tuned at:

4 X the carrier Cf (for Cf's 100 KHz to 500 KHz)

40 X the carrier Cf (for Cf's 10 KHz to 99.9 KHz)

C56 is a fixed value and this adjustment is made with L3.

CHECK OK _____

- B. Select R122 so the voltage at Q12 emitter is 1 V p.p. and permanently install R122 (100 ohm to 3 K ohm).

CHECK OK _____

RECORD VALUE

- C. Temporarily install R126 180 ohm. Monitor E16 with the o-scope/counter. Select C61 0 to 100% of the installed value of C62 so the circuit is center tuned. For the Narrow Band Demodulator Assembly, C61 is a fixed value. Make adjustment with L4.

CHECK OK _____

- D. Select R126 so the voltage at E16 is 2 V p.p. and permanently install R126.

CHECK OK _____

RECORD VALUE

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5-7 CLOCK SPLITTER

- Monitor E29 and E31 with CH1 and 2 of the O-scope. These signals should be square waves at the Cf spaced 90° apart.

Note - These monitor points are U8 Pin 5 and U8 Pin 9 on the Narrow Band Demodulator Assembly.

CHECK OK _____

5-8 INPUT FILTER RESPONSE

- A. Remove the input signal from the 7132.
- B. Connect a sine wave test oscillator to -- Junction of R95 and UM2 Pin 3
-- Junction of R96 and UM3 Pin 3

CAUTION: Amplitude greater than 0.5V P.P. may damage the mixer devices UM2 and UM3. Also the test oscillator output should be balanced around ground level (0 volts).

- C. From the record sheet record the input B.W.'s for the unit under test.

BW 4 _____

BW 2 _____

BW 3 _____

BW 1 _____

- D. Set the oscillator frequency at 0.1 X BW4, and set the 7132 BW switch to 4. Set the oscillator amplitude at 0.5V P.P., and maintain this amplitude constant throughout this test

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5-8 INPUT FILTER RESPONSE (continued)

- E. Monitor test points 1 and 2 with the O-scope and AC voltmeter. Set the oscillator frequency at each of the input bandwidth frequencies and measure the filter attenuation at each frequency, and at each point TP 1 and 2. Filter attenuation should be 2 to 5 dB.

RECORD ATTENUATION

	TP1	TP2	
BW 4	_____	_____	CHECK OK _____
BW 3	_____	_____	CHECK OK _____
BW 2	_____	_____	CHECK OK _____
BW 1	_____	_____	CHECK OK _____

Disconnect the test oscillator.

5-9 FILTER OFFSET ADJUSTMENT

- A. Using an O-scope or DC Voltmeter, monitor TP1 and adjust R42 so the voltage at TP1 is 0 volts $\pm 5\text{MV}$.
CHECK OK _____
- B. Monitor the output J8 and adjust R199 so the voltage is 0 volts $\pm 10\text{MV}$.
CHECK OK _____
- C. Monitor TP5 (U13 P6) and adjust R59 so the voltage is 0 volts $\pm 5\text{MV}$.
CHECK OK _____

5-10 INPUT GAIN ADJUST

- A. Remove the jumper from E7 and E8, and permanently connect E25 to E26.
- B. Set the 7132 to:
- o BW4
 - o Wide Loop
 - o S2

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5-10 INPUT GAIN ADJUST (continued)

- C. Connect a modulated PSK signal to J5: o 70 MV RMS*
 o At the center frequency

*10 V p.p. for the 10 K ohm input impedance option.

Modulation bit rate should be 0.5 BW4 for NRZ codes, or 0.25 BW4 for BIØ or DM code. A square wave oscillator may be used to simulate this. Set the frequency at 0.25 BW4.

- D. Monitor the Demod output J8 on the O-scope. The unit should be synchronized and the output waveform J8 should be the same as the simulated data prior to modulation. The output level at J8 RP should equal 1.5 V p.p. minimum.

CHECK OK _____

Monitor TP4 with the scope and adjust R59 for minimum amplitude of demodulated data.

CHECK OK _____

- E. Reduce the input level to 3.5 MV RMS*. Adjust R26 so the voltage at U3 P7 is = 3 V $\pm$ 0.5 V.

CHECK OK _____

*250 mV p.p. for the 10 K ohm input impedance option.

- F. Monitor U3 Pin 1 and adjust R27 so the signal appears unstable.

CHECK OK _____

5-11 SYNC LAMP ADJUST

- A. Increase the signal amplitude to 7 MV RMS* and adjust R75 until the sync signal appears unstable, then turn R75 one (1) turn C.W. The sync lamp should be solidly "ON" and the signal at J13 P24 should be Logic 1.

CHECK OK _____

*500 mV p.p. for the 10 K ohm input impedance option.

- B. Disconnect the input signal.

- o Sync lamp "OFF"
- o J13 P24 Logic 0

CHECK OK _____

- C. Reconnect the input signal and the unit should reaquire and the sync light will be "ON."

CHECK OK _____

- D. Vary the input carrier frequency beyond the unit's capture range until the unit loses sync as evident by the Demod out J8, the sync lamp should go "OFF."

CHECK OK _____

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5-12 LOOP CAPTURE RANGE

From the record sheet, calculate the Loop Capture Range for the wide and narrow loops.

3X Loop Bandwidth

Example -- 1 MHZ Cf

-- 0.3% Loop Wide

-- Capture Range is 1MHZ X .003 X 5, or ± 15 KHZ

LBE
0.985 MHZ

UBE
1.015 MHZ

-- ± 1500 HZ for Narrow Loop

Record limits for unit under test in Step A and D.

A. WIDE LOOP

LBE

UBE

Set the input carrier frequency to Cf $\pm 0.001\%$, and center the deviation meter, using the VCO balance control. Deviate the input carrier frequency to LBE, disconnect and re-connect the input signal. The unit should lose and re-acquire sync, as evident by the Demod output J8 and sync lamp.

CHECK OK _____

- B. Deviate the input carrier frequency to the UBE and repeat the step described in "A".

CHECK OK _____

- C. When the 7132 is synchronized to UBE, verify the meter deflection is to the right and reads between 20 and 30, which is 40 to 60% of full scale.

CHECK OK _____

- D. Switch to "NAR" Loop.

NARROW LOOP

LBE

UBE

Repeat Step A with the carrier frequency set at LBE for the Narrow Loop.

CHECK OK _____

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5-12 LOOP CAPTURE RANGE (continued)

E. Repeat Step B with the carrier frequency set at UBE for the narrow loop.
CHECK OK _____

F. When the 7132 is synchronized to the UBE narrow loop, verify meter deflection is to the right and reads between 20 and 30, which is 40 to 60% of full scale.
CHECK OK _____

5-13 DEMOD TEST POINT

Using an O-scope, verify the demodulated output signal is present on the front panel test point.
CHECK OK _____

5-14 VCO TEMPERATURE COMPENSATION

If the unit includes the Down Converter option, proceed to paragraph 7.2 then return to this test.

Calculate the allowable drift for 25°C temperature change and record:

LOOP WIDTH %

PPM/°C W/O DOWN CONVERTER

0.1 to 0.3

60

0.01 to 0.03

6

0.003 or less

2

EXAMPLE:

$$\begin{array}{ccccccc} 25 & \times & 2 \times 10^{-6} & \times & 21.4 \times 10^6 & = & 1.07\text{KHz} \\ \text{OC} \quad \downarrow & & \downarrow & & \downarrow & & \\ & & 2 \text{ PPM} & & \text{Cf (Input Frequency to Demod BD)} & & \end{array}$$

NOTE: If the unit includes a Down Converter, add an additional 1 PPM/°C. This is related to the Down Converter input frequency.

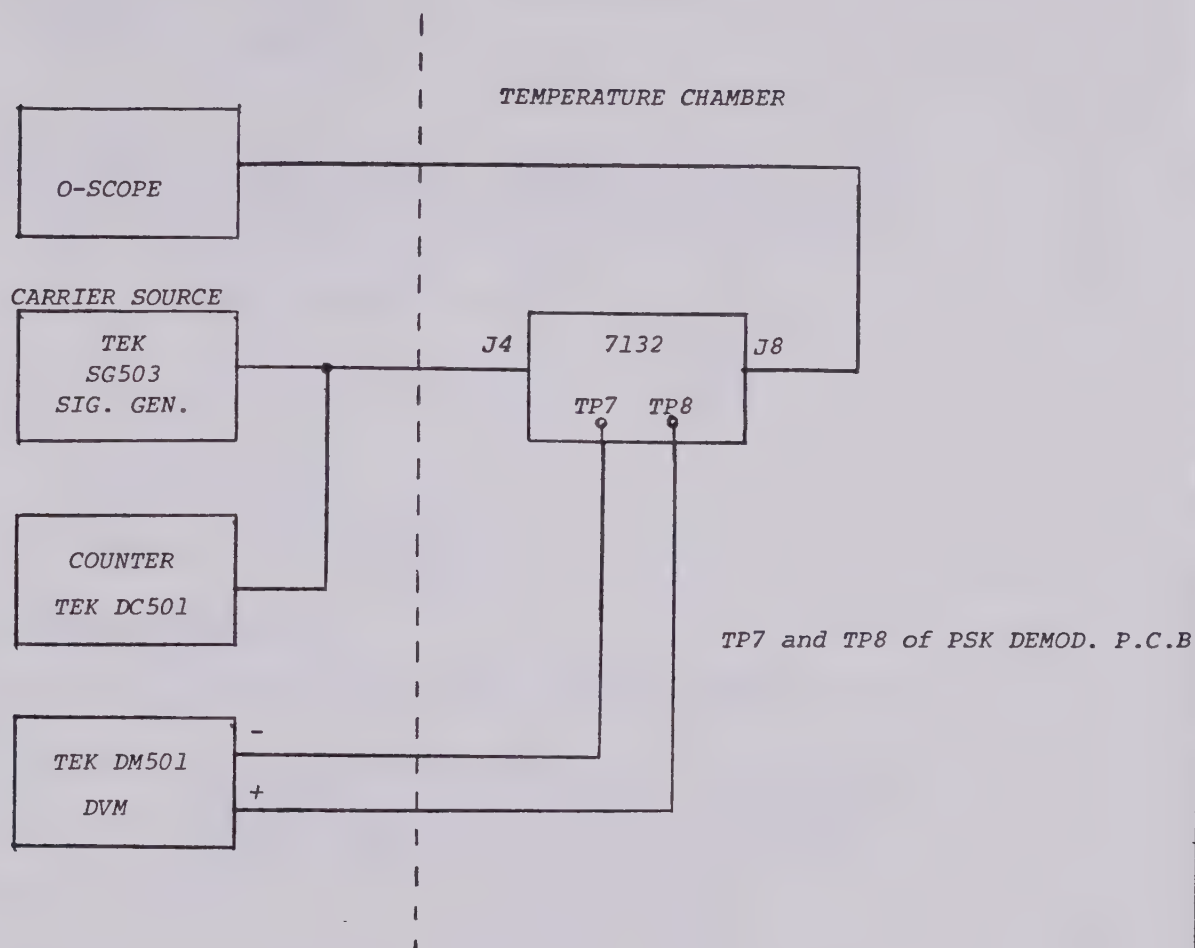
$$25 \times 1 \times 10^{-6} \times 110\text{MHz} = 2.75\text{KHz}$$

Allowable drift is ± 1.07 KHz W/O Down Converter or ± 3.82 KHz with Down Converter.

RECORD _____

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CONNECT THE UNIT AS SHOWN:



- A. Throughout the test, monitor the demodulator output J8 to verify an "In Sync" condition:
 - IN SYNC - DC Level
 - OUT SYNC - Beat frequency of VCO and input signal
- B. The demodulator Cf is measured by adjusting the Cf of the carrier source so the deviation meter is centered. When the unit is in sync, the carrier source and VCO frequencies are equal.
- C. Place unit in temperature chamber with both top and bottom covers installed. Allow 20 minutes settling time at room temperature. Record Cf to seven digit resolution _____.

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- D. Cycle to 50°C, allow 20 minutes settling time.
Record Cf _____
If drift was < allowable, test is complete.
- E. If drift is > allowable, allow 20 minutes settling at room temperature, then adjust R10 on the demod board so the voltage at TP7 is 100 mv more positive for a positive frequency shift or 100 mv negative for a negative frequency shift.

RECORD ADJUSTED VOLTAGE _____

- F. Repeat step D and E until drift is within allowable tolerance.

FINAL SETTING

Cf _____

DRIFT _____

CHECK OK _____

6-0

PSK MODULATOR, NARROW BAND

This procedure is intended for factory calibration, and may be used for periodic re-calibration.

NOTE TO CUSTOMER: The carrier output level is factory set at 70mv R.M.S. The output level may be reset by the customer up to 2V p.p. Record this level for future reference; reference paragraph 6-10 of this procedure.

APPLICABLE DOCUMENTS:

SCHEMATIC #015056

ASSEMBLY #012056

6-1

CARRIER CENTER FREQUENCY

- Subcarrier switch "ON"
- Mixer switch "OFF"
- Sideband filter "IN"

- A. Determine specified Cf for unit under test from record sheet, and record _____.
- B. Measure Cf at U6 P11 of the modulator P.C.B. with frequency counter and adjust C4 so the frequency is within +0.003%.

If required, select test variable C3 0 to 1000 pf, and make final adjustment with C4.

RECORD C3 _____

RECORD Cf _____

CHECK OK _____

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6-2

HARMONIC REJECT FILTER

Verify the signal at U5 P4 is a sine wave $\approx 0.5V$ P.P.

CHECK OK _____

6-3

SIDE BAND FILTER RESPONSE

- A. From the record sheet, record filter cutoff frequency _____

Turn sub-carrier switch "OFF", and connect a sine wave test oscillator to the junction of R14, 15 through a 510 ohm series resistor. Set the amplitude to 1V P.P., and the frequency at 0.1 x filter cutoff. Monitor this point with an oscilloscope, and maintain this level constant throughout this test.

- B. Connect an AC voltmeter to the junction of R3 and U7 Pin 4.. Increase the test oscillator frequency to the cutoff frequency recorded in "A". Filter attenuation should be 2 dB to 5 dB from reference level at 0.1 X frequency.

RECORD _____ CHECK OK _____

- C. Turn side-band filter switch to "By-Pass"; attenuation should be ± 0.5 dB from reference level at 0.1 X frequency.

RECORD _____ CHECK OK _____

Disconnect test oscillator and voltmeter, and switch side-band filter "IN" and carrier switch "ON".

6-4

CARRIER SUPPRESSION ADJUST

- A. Apply a TTL square wave to "MOD DATA IN" J9 at 0.25 X the filter cutoff frequency.
- B. Connect the "MOD OUT" J6 to an AC voltmeter via a 50 ohm coax., terminated by a 50 ohm load. Also monitor E5 with an O-scope. Adjust the level control R36 for 1 V P.P. output, then adjust the carrier suppression control R21 so the P.P. carrier amplitude "J6" is equal when the "MOD DATA IN" J9 is either Logic 1 or 0.

6-5

MODULATION INDEX

- A. Disconnect J9 and trigger the O-scope from U6 Pin 11, and calibrate the O-scope horizontal gain so 1 carrier cycle is framed across the full trace of the scope.

CHECK OK _____

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6-5

MODULATION INDEX (Continued)

- B. Ground J9 and the carrier should reverse phase. The zero crossing point of the carrier signal should be within $\pm 5^\circ$ of the reference point in "A".

CHECK OK _____

NOTE: If the optional line termination is connected, E15 and E16, a Logic 1 must be applied to J9 to cause the carrier phase reversal.

6-6

MIXER INPUT GAIN

- A. Turn carrier switch "OFF", mixer switch "ON", and apply a 100KHZ sine-wave to J7 at 1 V P.P.

Monitor E3 throughout this test with the O-scope to maintain this level constant.

- B. The output at J6 should be 0.7V to 1.4V P.P. (250 mv to 500 mv RMS)

RECORD _____ CHECK OK _____

- C. Turn mixer switch "OFF" and "ON", and the output will be alternately blanked and enabled.

CHECK OK _____

6-7

MIXER INPUT RESPONSE

- A. Re-adjust the input level slightly so the output reads a convenient reference point on the dB scale of the meter.

- B. Vary the input frequency from 3KHZ to 3MHZ, and verify the amplitude variation is not greater than ± 3 dB of the reference point in "A".

CHECK OK _____

6-8

MOD OUT OUTPUT IMPEDANCE

- A. Turn the Mix Switch "OFF", and carrier "ON"; adjust R36 so that output reads a convenience reference point on the dB scale of the AC meter (at or near 1V p.p.).

- B. Disconnect the 50 ohm load, and verify the output level increases 6dB ± 1 dB.

CHECK OK _____

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6-9

MOD OUT TEST POINT

Connect the AC meter to the front panel test point. The output level should be within +0.5 dB of the voltage in paragraph 6.8 "B". A DC offset of < 130 mv is normal.

CHECK OK _____

6-10

OUTPUT LEVEL ADJUSTMENT

Connect the AC voltmeter back to J6, using the 50 ohm load.

NOTE: This output level adjustment (R36) is intended for customer use. If the unit is being factory tested, set this level to 70 mv RMS +5 mv.

CHECK OK _____

Or re-set to desired level:

Desired Operating Level _____ *

Level Re-set To _____ *

*NA for factory test

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7-0 7132 WIDE BAND MODULATOR ASSEMBLY

The Wide Band Modulator Assembly contains four (4) 7132 options:

- Applicable Documents - Schematic #015060
- Assy. #012060
- Wide Band Modulator -
- Computer Interface -
- Frequency Translator -
- +10 DMB Option (With Mod. Only) -

Check the options applicable to the particular unit under test and put "NA" by those not applicable.

7-1 WIDE BAND MODULATOR

7-1.1 CRYSTAL OSCILLATOR:

- ° Turn Front Panel Carrier Switch to "ON".
- ° Connect the O-Scope to Q9 emitter, also monitor this point with the Frequency Counter.
- ° From the variable chart information or the record sheet supplied in the front of the Instruction Manual, record the Modulator Cf.
_____ MHz
- ° Adjust C30 so the amplitude peaks*, it is permissible to trim C32 $\pm$ 50%.
_____ CHK
- ° Adjust C29 so the frequency is within $\pm 0.001\%$ of the recorded Cf.
_____ Record Frequency
_____ CHK
- ° Remove the Frequency Counter from Q9 and move the Scope Probe to M2 P8. Adjust C36 and R44 so the amplitude peaks* and is within the range of 350 to 450 MV P.P. It is permissible to trim C38 $\pm$ 50%.
_____ CHK

*When properly adjusted, a peak will occur at two different settings of the trimmer cap.

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7-1.2 SIDE BAND FILTER:

- ° Remove any Rear Panel Connection to the Modulator Input. Connect a sine wave oscillator to the junction of R68 and R80, use a 75 ohm resistor in series with the oscillator.
- ° From the variable chart or record sheet record the cutoff frequency. (fc)
- ° Connect one channel of the scope to R80, 68 junction, set the signal amplitude @ 1V P.P., frequency @ fc.
- ° Turn Side Band Filter Switch to "BYPASS".
- ° Connect the other scope channel to U4, Pin 4, also monitor this point with the R.M.S. DVM. The signal amplitude should be 0.9V to 1.0V P.P.

RECORD LEVEL _____

_____ CHK

- ° Turn the Side Band Filter Switch to "IN". The signal should drop 2 to 4 DB. Trim R82 $\pm 25\%$ if necessary.

RECORD LEVEL _____

_____ CHK

7-1.3 CARRIER SUPPRESSION AND OUTPUT LEVEL

- ° Remove the 75 ohm resistor and sine wave oscillator, connect a TTL square wave using the function generator to the Rear Panel "MOD IN". Frequency @ .5 fc.
- ° Monitor the Rear Panel "MOD OUT" using the scope via a 50 ohm coax terminated by 50 ohms.
- ° Set R54 to its approximate center position, and adjust R69 so the carrier amplitude is equal for logical "1" or "0" levels at the "MOD IN".
_____ CHK
- ° Adjust R54 so the amplitude is 22.3 MV RMS $\pm$ 2.2MV (W/O ± 10 DBM Option) or 707.7 MV RMS ± 70 MV with ± 10 DBM Option.
_____ CHK
- ° Verify the signal is present at the Front Panel Mod Out test point, note the level may be lower because of the isolation resistor.
_____ CHK
- ° Turn the Carrier Switch "OFF" and verify the amplitude drops 20 DB or more. (Rear Panel Mod Out)
_____ CHK

TITLE TEST PROCEDURE PSK MODEM				MODEL 7132	
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7-1.4 MIX INPUT:

- ° Apply a 10MHz sine wave to the Rear Panel "MIX INPUT" at 0.1V P.P. Monitor the "MOD OUT" with the scope using a terminated 50 ohm coax line. The output should be 35.3 to 70.7 MV P.P. or 1.1V to 2.2V P.P. with the ± 10 DBM Option.

_____CHK

7-2 FREQUENCY CONVERTOR

From the record sheet or variable chart record the Cf _____,
and IF frequency _____.

The Convertor Oscillator operates at $f_o = C_f - I_f$ record _____.

7-2.1 CONVERTOR OSCILLATOR:

- ° Monitor Q6 col. with the O-Scope. Adjust C23 so the amplitude peaks at the Osc. frequency. It is permissible to trim C25 $\pm 50\%$ if necessary.

_____CHK

- ° The signal amplitude should be 1.5V p.p $\pm 10\%$. Trim R31 if necessary (10 to 100 ohms).

_____CHK

- ° Monitor Q6 col. with the frequency counter, and adjust C21 so the frequency is $f_o \pm 0.001\%$.

RECORD FREQUENCY _____ CHECK OK _____

- ° Turn the 7132 power OFF and ON several times to insure the oscillator starts

CHECK OK _____

NOTE: When properly adjusted the amplitude peaks will occur at different settings of C23. Use a spring type clip directly on the scope probe end.

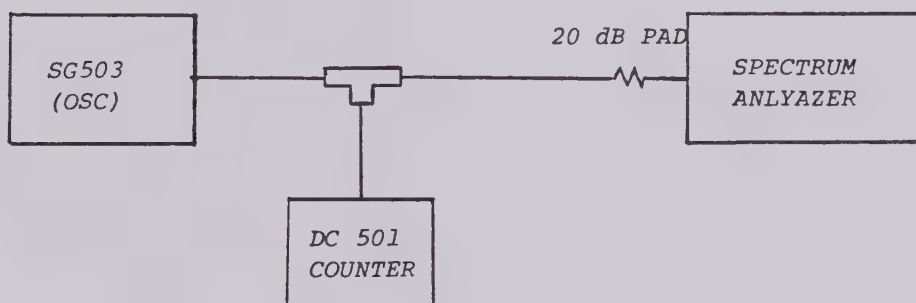
TITLE				MODEL	
TEST PROCEDURE				7132	
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7-2.2 INPUT FILTER

- ° Set R8 on the wide band mod assembly maximum CW.
- ° Temporarily install R3 and R11 1K 5%, do not leave long leads on bottom of P.C.B.
- ° Temporarily disconnect E9 and E10 from the (wide band mod to demod) and connect a short piece of RG58. This will be connected to the spectrum analyzer after its calibration.

7-2.3 SETUP

- ° Allow a 30 minute warm up period for the frequency counter and spectrum analyzer, then connect as shown below:



- ° Set the SG503 frequency to within $\pm 0.001\%$ of Cf.
- ° Spectrum Analyzer
 - Bandwidth record specified double-sided bandwidth for the frequency converter input filter _____, then set the spectrum analyzer bandwidth so this will be contained in 2 to 4 CM's of the display.
 - Video filter "OFF".
 - Set Cf so the signal appears in the center of the display.
 - Set all other controls as required to give the best display presentation.
- ° Set the SG503 amplitude so the level is -30dBm, then readjust the spectrum analyzer frequency to the (IF) frequency.
- ° Connect the SG503 output using the 20 dB pad to J4 of the 7132 (source switch SI) and E9 and E10 to the spectrum analyzer.
- ° Adjust C1 and trim C2 (range $\pm 50\%$) if necessary so the amplitude peaks, when properly adjusted there will be two peaks at different settings of C1. CHECK OK _____
- ° Adjust C9 and trim C10 (range $\pm 50\%$) if necessary so the amplitude peaks at two different settings of C9. CHECK OK _____

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7-2.4 BANDWIDTH CALIBRATION

If a sweep generator is available, it may be used instead of the SG503 otherwise, manually sweep the SG503 across the band. Set the display persistence so the response curve is stored.

If the bandwidth is greater than specified, increase the value of R3 and R11 proportionally or visa-versa. It is permissible to readjust C1 and C9 to optimize the response.

RECORD UBE - _____ dB

RECORD LBE - _____ dB

CHECK OK _____

7-2.5 GAIN

Using the SG503 oscillator at J4 input of the 7132 FREQUENCY - Cf
AMPLITUDE - -30dB

Adjust R8 on the wide band mod. assembly, so the amplitude (E9 and E10) is -30dBm to -33dBm.

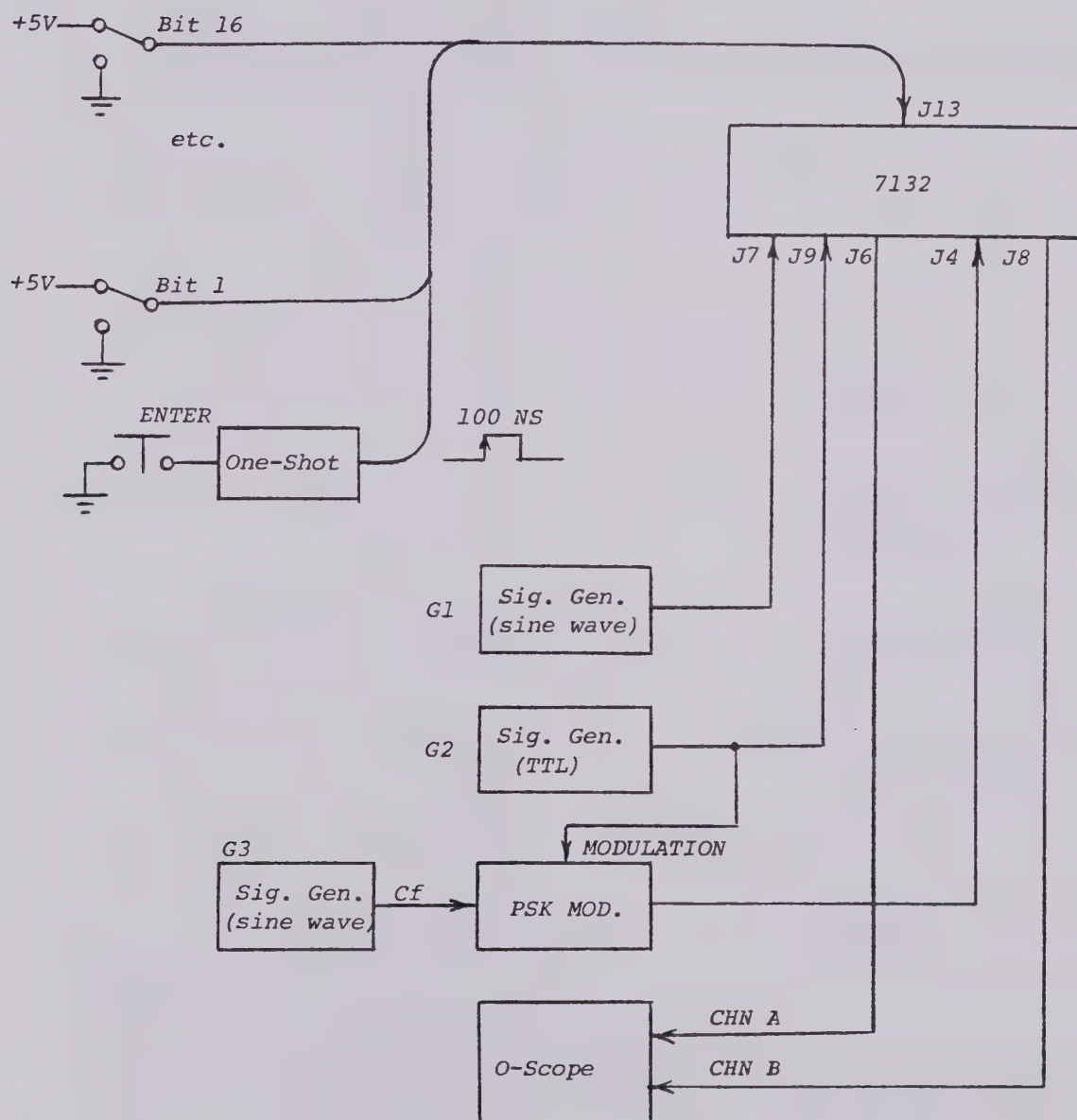
Re-connect E9 and E10 to the demod board.

CHECK OK _____

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COMPUTER INTERFACE OPTION

Connect the computer interface test fixture to the 7132 J13 rear panel, and external equipment as shown below:

TEST CONFIGURATION

NOTE: This test is a functional test only to verify B.W.'s, inputs, etc.; and may be programmed remotely. Actual measurements were performed in local control. (Previous sections of this procedure.)

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MODULATOR

Check NA if this option is not supplied, and proceed to paragraph 9.

NA _____

- A. Place the Bandwidth switch in "RMT" position for each test.
Set the input program as shown.
- B. Set G1 to 1 V P.P. 100KHZ sine wave.
- C. Set G2 to a TTL level square wave, frequency 0.5 specified bandwidth of side band filter. (See record sheet.)
- D. Set dip switches 1-4 on Modulator Assy (all zero's), + side down.
- E. Set program as follows and press "ENTER" switch for each step:

BIT

16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

- F. 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 No output should be present at J6.
CHECK OK _____
- G. 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 Modulated carrier at J6; signal should appear un-filtered.
CHECK OK _____
- H. 0 0 0 0 0 0 0 1 0 0 0 0 0 1 0 1 Signal now appears filtered.
CHECK OK _____
- I. 0 0 0 0 0 0 0 1 0 0 0 0 0 0 1 0 Carrier "OFF", 100KHZ is present at J6.
CHECK OK _____
- J. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 Same as I.
CHECK OK _____
- K. 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 No output J6.
CHECK OK _____

MODULE ADDRESS

16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

- A. Dip Switch 1 + side up, others down.
0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 1 Carrier at J6
CHECK OK _____
- B. Dip Switch 2 + side up, others down.
0 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 Carrier at J6
CHECK OK _____

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8-2

MODULE ADDRESS (Continued)

- 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
- C. 0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 0 No output J6
CHECK OK _____
- D. Dip Switch 3 + side up, others down.
0 0 1 0 0 0 0 1 0 0 0 0 0 0 0 1 No output J6
CHECK OK _____
- E. 0 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 Carrier at J6
CHECK OK _____
- F. Dip Switch 4 + side up, others down.
0 1 0 0 0 0 0 1 0 0 0 0 0 0 0 0 Carrier at J6
CHECK OK _____
- G. 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 No output J6
CHECK OK _____

8-3

PSK DEMODULATOR

- 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
- A. 1 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0
Set the modulating frequency G2 at ≈ 0.25 BW4. Adjust the PSK test modulator amplitude to ≈ 70 mv RMS. Adjust G3 frequency so the 7132 is synchronized as evident by the sync lamp and demodulated output J8. Fine tune the frequency of G3 so the deviation meter is centered.
CHECK OK _____
- B. 1 0 0 0 0 0 0 0 0 0 0 0 1 0 0
The input B.W. is now switched to B.W. 3 as evident by the output which appears more heavily filtered. The unit may lose sync, depending on the ratio of BW 4 and 3.
CHECK OK _____
- Reduce the frequency of G2 to $0.25 \times$ BW 3. The unit should be synchronized.
CHECK OK _____
- C. 1 0 0 0 0 0 0 0 0 0 0 0 1 0
Switches to BW 2 output is more heavily filtered; unit may lose sync.
CHECK OK _____
- Reduce frequency of G2 to $0.25 \times$ BW 2; the unit should be synchronized.
CHECK OK _____

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PSK DEMODULATOR (Continued)

16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

D. 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1

Switches to BW 1 output is more heavily filtered; unit may lose sync.

CHECK OK _____

Reduce G2 frequency to $0.25 \times BW 1$; unit is now synchronized.

CHECK OK _____

E. 1 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0

Switches to BW 4 leave G2 frequency as is, and adjust the test modulator frequency so the deviation meter reads nearly full scale (right or left). Unit is synchronized.

CHECK OK _____

F. 1 0 0 0 0 0 0 0 0 0 1 1 1 0 0 0

Switches to wide loop, deviation meter should be near center scale; unit is synchronized.

CHECK OK _____

G. 1 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0

Switches to input 2 J5; unit loses sync.

CHECK OK _____

H. Connect the test modulator to J5; unit re-captures sync.

CHECK OK _____

I. 1 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0

Unit loses sync.

CHECK OK _____

TITLE			TEST PROCEDURE PSK MODEM		MODEL 7132
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9-0 GPIB
If this option is not installed, check here.

CHECK OK _____

9-1 DEVICE ADDRESS AND STANDARD CONFIGURATION

STEP

1. Ensure the 7132 is turned OFF. CHECK OK _____
Connect the computer to the GPIB connector on the 7132 Rear Panel.
2. Set switch SW2 on the GPIB Board to 00001111 for the device. Device address (OE-HEX) (SW2-8 is the MSB and SW2-1 is the LSB). Set a "0" by pressing the "ON" side and a "1" by pressing the "OFF" side. CHECK OK _____
3. Set the Standard Configuration switch to SW1 to 11110101.

TABLE 9-1
STANDARD CONFIGURATION SWITCH SETUP

(Set to "0" by pressing the ON side and a "1" by pressing the OFF side of the switch).

SW	8	7	6	5	4	3	2	1
SW1	CARRIER	MIXER	SB FILTER	INPUT	INPUT		LOOP BW	
	ON=1	ON=1	IN=1	INP 1=1	BANDWIDTH		WIDE=1	
	OFF=2	OFF=0	OUT=0	INP 2=0			NARROW=0	
					BW1 0	0	0	
					BW2 1	0	0	
					BW3 0	1	0	
					BW4 0	0	1	

4. Set the Front Panel BANDWIDTH switch to RMT (REMOTE). Turn the unit "ON." CHECK OK _____
5. Load the 7132 Test Program into the computer CHECK OK _____
6. Verify on the monitor, the unit turns ON in the Standard Configuration at set in Step 3 and as shown above in Table 9-1 (IBRD 50.). CHECK OK _____
7. Turn the unit "OFF." Set the Front Panel BANDWIDTH switch to bandwidth 4. Set the Standard Configuration switch SW1 to 00001000 CHECK OK _____
8. Turn the unit back "ON." Verify the unidentified control message is "ON." Set the BANDWIDTH switch to RMT (REMOTE) and verify the 7132 is in the Standard Configuration as set in Step 7 per Table 9-1. CHECK OK _____

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9-1 DEVICE ADDRESS AND STANDARD CONFIGURATION (continued)

9. Verify the Unidentified Control Message is "OFF."
CHECK OK _____
10. Set the Unidentified Control Message to "ON" with the computer.
CHECK OK _____
11. Verify from the status on the monitor that the Unidentified Control Message is "ON."
CHECK OK _____

9-1.1 READBACK FROM THE 7132

The GPIB controller requests readback from the 7132 by:

- setting the 7132 to listener mode.
- sending a listener data message "REQn.". (optional)
- setting the 7132 to talker mode.

The current status and configuration is defined as the current state of the 7132, regardless of LOCAL/REMOTE state. The current status and configuration is sent back to the host as a single, fixed length string.

REQ0. READBACK

NO BYTE	MSB 7 6 5 4	3	BIT 2	1	LSB	HEX VALUE	ASCII VALUE
0	0 1 0 0	0	1	0	0	44	D
1	0 1 0 0	1	1	0	1	4D	M
2	0 0 1 1	0=REMOTE 1=LOCAL	0=SYNC 1=OUT OF SYNC	0	1=UNIDENT IFIED MESSAGE	3x	
3	0 0 1 1	0=INPUT 1 1=INPUT 2	00=BANDWIDTH 1 01=BANDWIDTH 2 10=BANDWIDTH 3 11=BANDWIDTH 4	0	0=LOOP BW NARROW 1=LOOP BW WIDE	3x	
4	0 0 0 0	1	1	0	1	0D	(CR)
5	0 0 0 0	1	0	1	0	0A	(LF) + EOI

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9-2 MODULATOR - GPIB CONTROLLED

Check here if the unit is not supplied with this option.

CHECK OK _____

STEP

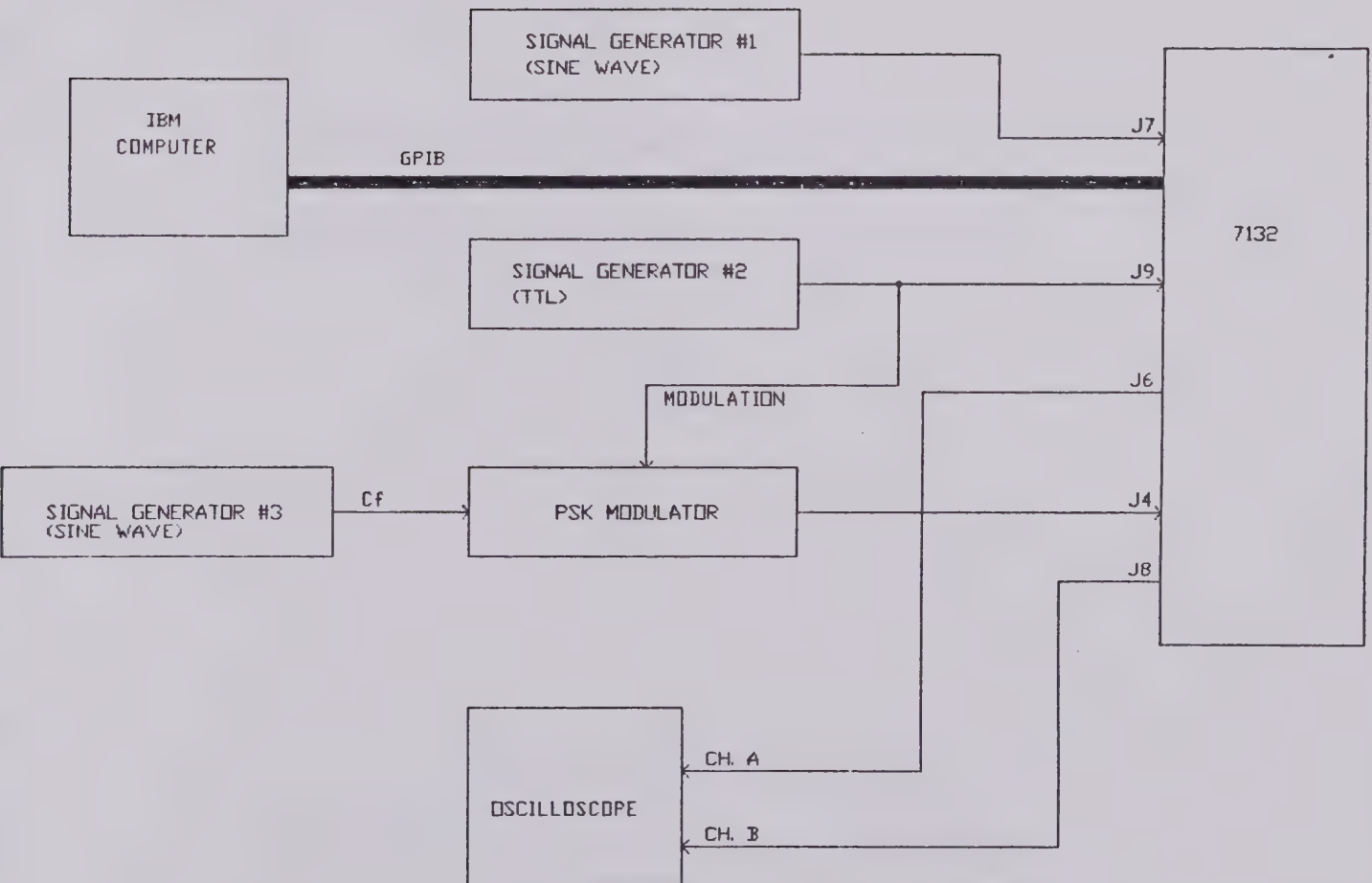
1. Set up this test as shown in Figure 9-1. CHECK OK _____
2. Select Carrier ENABLED, Mixer OFF, S.B. Filter OUT with the computer (IBWRT "CARE. MIXF. FILO.") CHECK OK _____
3. Set Signal Generator #1 to 1 V p.p. at 100 KHz sine wave. CHECK OK _____
4. Set Signal Generator #2 to a TTL level square wave at a frequency of one-half the specified Sideband Filter Bandwidth. CHECK OK _____
5. Verify there is a modulator output at J6. CHECK OK _____
6. Select Carrier DISABLED with the computer. (IBWRT "CARD.") CHECK OK _____
7. Verify there is not output at J6. CHECK OK _____
8. Select Carrier ENABLED and Sideband Filter IN with the computer (IBWRT "CARE. FILI.") CHECK OK _____
9. Verify there is a filtered signal at J6. CHECK OK _____
10. Select Carrier DISABLED and Mixer ON. (IBWRT "CARD. MIXN.") CHECK OK _____
11. Verify the presence of 100 KHz at J6. CHECK OK _____

D-2867; D-2925 (278a/75a)

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FIGURE 9-1

7132 GPIB SET UP



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9-3 DEMODULATOR - GPIB CONTROLLED (continued)

12. Select the Wide Loop (IBWRT "LBW1.>"). Verify the deviation meter is near center scale and the unit is now synchronized. CHECK OK _____
13. Select Input 2 (IBWRT "INP2.>"). Verify the unit loses sync. CHECK OK _____
14. Move the modulator input from INPUT 1 (J4) to INPUT 2 (J5). Verify the unit resynchronizes. CHECK OK _____
15. Select Input 1 (IBWRT "INP1.>"). Verify the unit loses synchronization. CHECK OK _____

10-1 FINAL INSPECTION

TESTED BY: _____

INSPECTION BY: _____

D-2867; D-2925 (278a/75a)

TITLE TEST PROCEDURE PSK MODEM				MODEL 7132
CODE IDENT 55744	SCALE	DWG NO. 019110	REV M	SHEET 31 of 31

STEP

1. Ensure the setup is as shown in Figure 9-1. Signal Generator #1 is not needed for this portion of the test.
CHECK OK _____
2. Ensure the BANDWIDTH switch is set to RMT (REMOTE).
CHECK OK _____
3. Select Narrow Loop Bandwidth, Input Bit Rate 4, and Input 1 with the computer (IBWRT "BW0. BRT4. INP1.") CHECK OK _____
4. Set the modulating frequency at Signal Generator #2 to 0.25 BW4. Adjust the PSK Test Modulator Amplitude to approximately 70 MV RMS. Adjust the Signal Generator #3 frequency so the 7132 is synchronized as evident by SYNC and the demodulated output at J8. Fine tune the frequency of the Signal Generator #3 so the deviation meter is centered.
CHECK OK _____
5. Select Input Bandwidth 3 (IBWRT "BRT3."). Verify the Input Bandwidth is not switched to BW3, as is evident by the output which appears more filtered. The unit may lose sync.
CHECK OK _____
6. Reduce the frequency of Signal Generator #2 to 0.25 x BW3. Verify the unit is now synchronized.
CHECK OK _____
7. Select Input Bandwidth 2 (IBWRT "BRT2."). Verify the output appears more filtered. The unit may lose sync.
CHECK OK _____
8. Reduce the frequency of Signal Generator #2 to 0.25 x BW2. Verify the unit is now synchronized.
CHECK OK _____
9. Select Input Bandwidth 1 (IBWRT "BRT1."). Verify the output appears more filtered. The unit may lose sync.
CHECK OK _____
10. Reduce the frequency of Signal Generator #2 to 0.25 x BW1. Verify the unit is now synchronized.
CHECK OK _____
11. Select Input Bandwidth 4 (IBWRT "BRT4."). Adjust Signal Generator #2 so the deviation meter reads nearly full scale (right or left). Verify the unit is now synchronized.
CHECK OK _____

D-2867; D-2925 (278a/75a)

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RECORD SHEET

7132 PSK MODEM

CUSTOMER _____ ORDER # _____

DELIVERY DATE _____

UNIT SERIAL # _____

DEMODULATOR ASSY SERIAL # _____

Cf _____

BW 4 _____

BW 3 _____

BW 2 _____

BW 1 _____

Loop Wide _____

Loop Narrow _____

*Invalid operating bandwidth positions when in wide loop position.

MODULATOR OPTION ASSY SERIAL # _____

Cf _____

Side Band Filter Cutoff _____

Check Wide or Narrow Band Version _____

+10 dBm Option _____

Frequency Converter Option _____

Record "IF" Frequency _____



QUALITY **INNOVATION**



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